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CORRECTIONS AND EMENDATIONS OF THE SECOND EDITION OF SARGENT'S MANUAL OF THE TREES OF NORTH AMERICA

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In the preparation of this long list of corrections in the second edition of my Manual of the Trees of North America, Boston, 1921, I am greatly indebted for help given me by Dr. R. M. Harper of Florida, T. G. Harbison of North Carolina, Professor R. S. Cocks of Louisiana, Professor John W. Harshberger of Philadelphia, C. C. Deam of Indiana, Dr. Robert Ridgway of Illinois, E. J. Palmer of Missouri, and Miss Alice Eastwood of San Francisco.

TABLE OF CONTENTS.

Page ix, for *Monocotyledons and Dicotyledons* read *Monocotyledones and Dicotyledones*

SYNOPSIS

Page xi, for **MONOCOTYLEDONS** and **DICOTYLEDONS** read **MONOCOTYLEDONES** and **DICOTYLEDONES**

line 1 of Division ii, for *or read and*

Page xii, for *Anonaceae* read *Annonaceae*

Page xiii, for *Malpigiaceae* read *Malpighiaceae*

Page xiv, in lviii, for *Styraceae* read *Styracaceae* and after 4 and 6 insert hyphens

line 2 from bottom, insert a hyphen after 4

Page xv, in lxxv, line 1, insert a hyphen after 4

ANALYTICAL KEY

Page xvi, line 2, for *Monocotyledons* read *Monocotyledones*

Page xvii, for *Thuja* read *Thuja* and for *Dicotyledons* read *Dicotyledones*

Page xx, for *Ceanothus spinosus* read *Ceanothus spinosus*

Page xxi, for *Anona* read *Annona*

Pinus Strobus

Page 3, line 3 from bottom, for *northern Indiana* read *central Indiana*

Pinus cembroides var. *edulis*

Page 10, line 17, for *Lorimer* read *Larimer*

Pinus caribaea

Page 15, BEFORE *Pinus heterophylla* Sudw. ADD AS A SYNONYM *Pinus Elliottii* Engelm.

Pinus palustris

Page 15, line 11, for $\frac{1}{16}' - \frac{1}{2}'$ read $\frac{1}{8}' - \frac{1}{2}'$

line 24, after Counties) insert: ranging inland in Georgia to the neighborhood of Cartersville and Rome, and ascending to altitudes of 1900 feet on the Blue Ridge in Alabama; and

Page 16, line 7, for Bark $\frac{3}{4}' - \frac{1}{2}'$ read Bark $\frac{3}{4}' - 1\frac{1}{2}'$

Pinus taeda

Page 17, line 16-18, for to the shores of Indian River and Tampa Bay, Florida read to near Palatka, Putnam County, in eastern Florida, and in western Florida to the neighborhood of San Antonio, Pasco County

line 23, after Mississippi insert: in Georgia and Alabama sometimes ascending to altitudes of 1500 feet;

Pinus rigida var. serotina

Page 18, line 2 from bottom, after Florida add: (near Kissimee, Osceola County)

Pinus Banksiana

Page 25, line 17, for Harshburger read Harshberger

Pinus glabra

Page 26, line 2, for eastern and southwestern read east central

line 3, for northeastern read southeastern

Pinus virginiana

Page 27, line 17, after New Jersey insert: west of the Pine barren region

Pinus clausa

Page 28, line 24, for Creek read River

Pinus pungens

Page 30, line 9, for 3000° read 4000°

Picea pungens

Page 39, line 9 from bottom, for Englm. read Engelm.

Tsuga caroliniana

Page 45, line 13, for 3000° read 4000°

ABIES

Page 51, for A. balsamifera in key read A. balsamea

Abies balsamea

Page 53, line 24, for (var. hudsonica Englm.) read (var. hudsonia Sarg.)

Abies lasiocarpa

Page 54, line 5, after New Mexico. add: This southern form is now often considered a species as *Abies arizonica* Merr.

Abies magnifica

Page 59, line 7 from bottom, for xanocarpa read xanthocarpa

Taxodium distichum

Page 65, line 5, after strong insert: very durable

line 18, for Sarg. read Croom

Taxodium distichum var. *imbricarium* is now usually and rightly considered a distinct species for which the correct name is *Taxodium ascendens* Brong.; the extension of its range into western Louisiana is not supported by specimens.

Libocedrus decurrens

Page 66, last line but one, *omit*: hardy and
last line, *after* states *add*: ; hardy in the Arnold Arboretum.

Chamaecyparis thyoides

Page 76, line 20, *omit* only and for southwestern *read* southeastern

Juniperus utahensis

Page 83, line 19, for *megalacocarpa* *read* *megalocarpa*

Juniperus virginiana

Page 88, line 8 from bottom, *after* woodenware *add*: , and now for lead pencils

Juniperus lucayana

Page 89, line 6 from bottom, for Milano, Milano County, *read* Milano, Milam County

Thrinax Wendlandiana

Page 99, line 4, for Hummock *read* Hammock

Coccothrinax

Page 100, line 6 from bottom, for stemless *read* often stemless northward

Sabal Palmetto

Page 103, line 17, for Metacomb *read* Matecumbe and *change* semicolon to a period

Sabal texana

Page 104, line 1, *change* on the Bernado River to of the Bernado River

Acoelorrhaphe

Page 105, add as a synonym: *Paurotia* Cooke.

Acoelorrhaphe Wrightii

Page 106, add as a synonym: *Paurotia Wrightii* Britt.

Roystonea

Page 107, line 16, for formed by the densely imbricated sheaths of the leaf-stalks *read* formed by the closely appressed sheath of the lowest leaf.

DICOTYLEDONS

Page 118, for DICOTYLEDONS *read* DICOTYLEDONES
line 8 from bottom, for or *read* and

Populus tremuloides

Page 121, line 4 from bottom, for infertile *read* fertile

Populus grandidentata

Page 123, line 4, for Michex. *read* Michx.

Populus heterophylla

Page 125, line 10, *add* eastern *before* Arkansas

line 11, *for* and Indiana *read* , northern Indiana (Laporte and Wells Counties)

Populus tacamahacca

Page 125, *for* tacamahacca *read* tacamahaca

Populus trichocarpa

Page 127, line 9, *for* Mátir *read* Mártir

Populus MacDougalli

Page 133, line 1, *for* McDougallii *read* MacDougallii

Populus balsamifera

Page 136, line 4, *for* Artisia *read* Artesia

Page 137, line 6, *after* Florida *insert* (valley of the Apalachicola River)

Salix Bonplandiana var. **Toumeyii**

Page 146, line 7, *for* Sicamore *read* Sycamore

Salix longipes

Page 148, line 19, *for* Tishamingo *read* Tishomingo

Salix lasiandra

Page 149, *add at top of page*: A tree often 60° in height with a trunk 2°-3° in diameter, or sometimes shrubby, and with straight ascending branches and rather stout branchlets, at first dark purple, reddish brown, or yellow, pilose with scattered hairs or pubescent or tomentose, and often covered by glaucous bloom, becoming dark purple, bright reddish brown or bright orange color. Winter-buds broadly ovate, acute, light chestnut brown and lustrous above the middle, pale at base, and nearly $\frac{1}{4}$ ' in length. Bark $\frac{1}{2}$ '- $\frac{3}{4}$ ' thick, dark brown, slightly tinged with red, and divided by shallow fissures in broad flat scaly ridges broken by cross fissures into oblong plates.

Salix exigua

Page 152, line 10, *omit* truly

Salix missouriensis

Page 156, line 20, *after* Iowa *insert*: ; and to the neighborhood of Olney, Richland County, Illinois (*R. Ridgway*)

MYRICACEAE

Page 163, line 4 from bottom, *for* waxy exudations *read* wax

Page 164, line 4, *FOR* *Myrica rubra* Sieb. & Zucc. *READ* *Myrica rubra* Sieb. & Zucc.

Myrica cerifera

Page 164, line 2 from bottom, *after* diameter, *insert*: or more often a large or small shrub, with

Page 165, line 11, *after* inland *insert*: over the coastal plain of Georgia
 line 12, *for* Jackson *read* Adams
 line 14, *for* Washita *read* Ouachita

Myrica inodora

Page 166, line 5, *for* Deep swamps *read* Small non-alluvial swamps mostly
 within fifty miles of the coast *and for* Apalachicola *read*
 Apalachicola

Juglans

Page 169, line 15, *omit*: (corolla?)

Juglans cinerea

Page 169, *for* J. cinera *in key*, *read* J. cinerea

Juglans nigra

Page 172, line 11, *after* Mississippi, *insert* Louisiana,

Juglans major

Page 173, line 15, *for* Banks *read* Near Fort Worth, Tarrant County,
 Texas (*E. J. Palmer*); and banks

Juglans Hindsii

Page 176, line 2, *for* Mt. Diabolo *read* Mt. Diablo

Carya pecan

Page 177, line 3 from bottom, *for* Asch. & Gr. *read* Engl. & Graebn.

Page 179, line 3, *for* Marias *read* Marais

Carya cordiformis

Page 181, line 8, *after* Alabama, *insert*: West Feliciana Parish, Louisiana,
 line 11, *after* Kansas. *add*: Very common in West Feliciana
 Parish, and up to 170 feet in height (*R. S. Cocks*).

line 14, *after* Arkansas *insert*: ; Missouri (Richards, Vernon
 County) and Kansas (Arkansas City, Cowley County)

line 17, *after* Arkansas *insert*: , and near Natchez, Mississippi

Carya aquatica

Page 182, line 22, *for* the valley of the lower Wabash River, *read* southern
 line 27, *for* Caloosahatchie River at Alma *read* Caloosahatchee
 River at Alva and La Belle *and for* Lafayette *read* Dixie

Carya myristicaeformis

Page 183, line 24, *after* southern *add*: and central; *and after* Arkansas *in-*
sert: northward to Faulkner County

line 26, *after* only *add*: near Selma, Alabama, and

Carya ovata

Page 184, line 3 from bottom, *for* Munroe *read* Monroe

Page 185, line 1, *for* bottom *read* bottoms

line 15, *for* Munroe *read* Monroe

Carya carolinae-septentrionalis

Page 185, line 15 from bottom, *for* Schn. *read* Engl. & Graebn.

Carya laciniosa

Page 186, for *Schn. read Loud.*

Page 187, line 2 from bottom, for *Munroe read Monroe*

Carya pallida

Page 190, for *Ashe read Engl. & Graebn.*

Page 191, line 27, for *northern read southern*

Carya glabra var. megacarpa

Page 193, line 3, for *Munroe read Monroe*

line 5, for *Callusahatchie read Caloosahatchee*

Carya ovalis var. obcordata

Page 195, line 4, after *Alabama insert:* and West Feliciana Parish, Louisiana

Carya ovalis var. odorata

Page 195, line 15 from bottom, after *Illinois insert:*, southeastern Missouri and Heber Springs, Arkansas and for *Oktibbaha read Oktibbeha*

Carya ovalis var. obovalis

Page 195, line 6 from bottom, for *Munroe read Monroe*

line 8 from bottom, after *Alabama insert:*, and West Feliciana Parish, Louisiana.

Carya floridana

Page 197, line 5 from bottom, for *8'-12' read 8"-12"*

Carya Buckleyi var. villosa

Page 200, line 9, after *Missouri insert:*, to southern Illinois, northern Arkansas and northeastern Oklahoma

Carpinus caroliniana

Page 202, line 21 before to the shores *insert* nearly

line 22, omit: (*Sharpy County*);

line 23, for *Kansas read* eastern and southern Missouri

Ostrya virginiana

Page 204, line 11, for *northern read* central

Betula lenta

Page 206, add as a synonym: *Betula alleghaniensis* Britt.

Betula papyrifera

Page 213, line 22, after *Michigan insert:* northern Indiana

Fagus grandifolia

Page 229, line 3 from bottom, omit: and northern Missouri and *insert* and before Minnesota

line 6 from bottom, before valley *insert* Nova Scotia,

Page 230, line 4, before Missouri *insert* southeastern

line 6, for *3000° read 4000°* or over

Castanea dentata

Page 232, line 14, for *Walton read Okaloosa, and after County) insert a comma*

Castanea pumila

Page 233, line 24 and 25, *omit*: , and through Arkansas to eastern Oklahoma and southwestern Missouri
 line 27, *after* Texas. *add*: In Arkansas, southern Missouri and eastern Oklahoma replaced by *C. ozarkensis* Ashe.

Quercus

Page 238, line 29, *for* Quercus Robur *read* Quercus robur

Quercus borealis

Page 241, line 23, *after* Michx. *insert* f.

Quercus borealis var. maxima

Page 243, line 5, *for* 3000 *read* 4000
 line 16, *for* Porterii *read* Porteri
 line 19, *after* Ohio *add*: and Dumas, Clark County, Missouri

Quercus Shumardii var. Schneekii

Page 245, line 6, *after* Kentucky *insert*: , Illinois (Wabash and Pope Counties), Indiana (Wells, Clark, Jennings, Galen and Posey Counties), and Ohio (Franklin and Gallia Counties)

Quercus coccinea

Page 248, line 10, *after* forest. *add*: The var. *tuberculata* from southern Massachusetts to Georgia, Alabama, Tennessee, Indiana, southern Illinois and Missouri.
 line 13, *for* illicifolia *read* ilicifolia

Quercus palustris

Page 249, line 9 from bottom, *for* on the coast plain south of the Hudson River *read* in the green sand belt of New Jersey and Delaware

Quercus georgiana

Page 250, line 18, *for* a few other granite hills below the Yellow and Oconee rivers in the region south and east *read* a few other granite or sandstone hills north and southwest

Quercus velutina

Page 251, line 17 from bottom, *after* Pine belt *add*: ; southward often with a more crooked stem and rougher bark (*R. M. Harper*).

Quercus Catesbaei

Page 254, line 1, *for* Creek *read* River
 line 4, *for* in the flat woods *read* in dry sandy uplands
 line 5, *for* Lake Istokpoga *read* near Fort Ogden
 line 6, *after* County *insert*: ; in Georgia inland over the coastal plain to the Pine Mountains, and in Alabama to Tuscaloosa County (*R. M. Harper*)

Quercus Ashei

Page 254, line 11, *for* Charleton *read* Charlton

Quercus rubra

Page 256, line 18, *after* Oklahoma *add*, Arkansas *and for* southwestern
read southeastern

Quercus marilandica

Page 258, line 2 from bottom, *for* the shores of Matanzas Inlet and Tampa
Bay, *read* northern

Page 259, line 10, *omit at and after* Carolina *add*: and Fulton, Hempstead
County, Arkansas

line 16, *after* Creek County), *add*: Arkansas (Fayetteville, Wash-
ington County, Eureka Springs, Carroll County), Missouri
(Prosperity, Jasper County),

line 17, *after* Berlin, *insert*: banks of the Alabama River near
Selma,

line 18, *for* Levey County *read* Levy County

Quercus arkansana

Page 260, line 19, *after* County, *insert*: and in Clark County, *and for* ; rare
and local *read* , east to Pike County, Alabama. By Trelease
considered a hybrid of *Q. marilandica* and *Q. nigra*. See
paper on *Q. arkansana* by Palmer in Jour. Arnold Arb. vi.
195 (1925).

Quercus rhombica

Page 261, line 16, *FOR Quercus rhombica* Sarg. *READ Quercus obtusata*
Ashe *AND ADD AS A SYNONYM: Quercus rhombica* Sarg.

Page 262, line 2, *for* to northern Florida *read* sparingly in Jackson County,
west Florida

line 5, *for rhombica* *read obtusata*

line 7, *for rhombica* *read obtusata*

Quercus Phellos

Page 263, line 21, *for* northeastern *read* western (Jackson County)

Quercus laurifolia

Page 264, line 18, *for* falling abruptly *read* many falling gradually
line 19, *after* branches *insert* partly

Page 265, line 8 and 9, *omit*: the shores of Bay Biscayne and

line 9, *for* Caloosahatchie *read* Caloosahatchee

line 10, *for* Istokpaga *read* Istokpoga;

line 16, *before* Louisiana *insert*: and Kisatchie, Natchitoches
Parish,

Quercus cinerea

Page 266, line 20, *for* the shores of the Indian River and Peace Creek
read Fort Myers, Lee County,

line 21, *for* Creek *read* River

line 29, *for* Lincoln *read* Harrison

line 33, *after* Berlin *insert* and near Selma

line 12 from bottom, *for* Milano County *read* Milam County

Quercus imbricaria

Page 268, line 2, *after* North Carolina *add* Bowling Green, Kentucky,
and omit central and northern
line 3, *omit* southeastern

Quercus Wislizenii

Page 271, line 6 from bottom, *after* County *insert*: , also in Placer, Marin
and other counties,

Quercus myrtifolia

Page 272, line 29, *for* Appalachicola *read* Apalachicola

Quercus Durandii

Page 289, line 1, *omit*: and De Soto, Sampson County;
line 2, *for* Muscogee *read* Lowndes *and for* Noxubesco *read*
Noxubee

line 6, *for* Nuovo Leon *read* Nuevo Leon

Page 290, lines 23 and 24, *for* peninsular *read* peninsula

line 23, *for* De Soto *read* Highlands

Quercus macrocarpa

Page 291, line 20 from bottom, *omit*: prairies of Caswell County, North
Carolina,

line 14 from bottom, *after* Oklahoma *insert*: Caldwell Parish
Louisiana (*R. S. Cocks*)

Quercus lyrata

Page 293, line 13, *after* Arkansas. *add*: Three Individuals of this tree in
the neighborhood of the town of Amana, Iowa County,
Iowa, far north of its known range, are reported by Professor
B. Shimek of the University of Iowa (see Bull. Torrey Bot.
Club, xlv. 293, t. 16 & 17 [1922]).

Quercus stellata var. **Margaretta**

Page 295, line 6 from bottom, *for* stonolifera *read* stolonifera

Quercus austrina

Page 300, line 12 from bottom, *after* De Soto *omit* Co.

Quercus alba var. **latiloba**

Page 302, line 9, *after* Oak *insert*: ; the var. *repanda* very common in
Ponchartrain Parish, Louisiana, and in Richland County,
Illinois

last 2 lines, *omit*: and in Richland County, Illinois

Quercus bicolor

Page 303, line 11, *omit*: or rarely scarlet before falling

Page 304, line 16, *for* Munroe *read* Monroe

Quercus montana

Page 305, *for* montana L. *read* montana Willd.

Page 306, line 13, *omit* northern *and after* Alabama *insert*: to Perry and
Hale Counties

Page 306, line 15, AFTER (*C. C. Deam*) ADD and on hills near Elberfeld, Warrick County

line 22, for *Q. Robur* read *Q. robur*

Quercus Muehlenbergii

Page 307, line 10 from bottom, after Michigan add: and western Wisconsin

Ulmus americana

Page 309, add as a synonym: *Ulmus floridana* Chapm.

Ulmus crassifolia

Page 315, line 16, for Morehead read Moorhead

line 17, after County), insert: and western Louisiana (very common in Rayville, Natchitoches Parish, (*R. S. Cocks*))

Celtis laevigata

Page 323, line 6 from bottom, for K. Koch read Willd.

Page 324, line 17, for Nuovo Leon read Nuevo Leon

Trema mollis

Page 328, line 1, after common; insert: noticed by R. M. Harper with many specimens in a large dense Palmetto grove a few miles north of Immokalee, Collier County;

Ficus

Page 333, line 4 from bottom, for South read southern

Magnolia grandiflora

Page 345, last line, for little used except for fuel read largely used in basket and crate making

Magnolia virginiana* var. *australis

Page 347, line 13 from bottom, after Louisiana add: and to the neighborhood of Malvern, Hot Spring County, Arkansas (*E. J. Palmer*)

Magnolia tripetala

Page 348, line 10 from bottom, after York Counties) insert: and Jackson County, Ohio

Liriodendron Tulipifera

Page 352, last line, add: A fastigate form (var. *pyramidata* Lav.) is occasionally cultivated.

Asimina triloba

Page 354, line 11 from bottom, for Western read northern and for (Taylor County) read (Clay and Taylor Counties)

Anona

Page 354, for ANONA read ANNONA

Page 355, line 12, for *Cherimolia* read *cherimola*

lines 11, 12, 14, 15, and 16, for *Anona* read *Annona*

Persea palustris

Page 359, line 8, for southeastern Virginia (Dismal Swamp) read North Carolina

Page 359, line 12, BEFORE *Autauga* ADD *Clay*, AND FOR *R. H. Harper* READ *R. M. Harper* AND AFTER *Harper*) ADD: ; very common in Pine barrens of eastern Louisiana (*R. S. Cocks*).

Hamamelis macrophylla

Page 370, line 2 from bottom, for *Wittlococoochee* read *Withlacoochee*

Page 371, line 2, for *Harding* read *Hardin*

Page 373, line 17, for western read middle and for *Gladson* read *Gadsden*

Vauquelinia californica

Page 378, line 13, for *Means* read *Mearns*

MALUS

Page 379, line 5, for *Hall*. read *Miller*

Malus glaucescens

Page 382, line 9, for *Munroe* read *Monroe*

Amelanchier canadensis

Page 395, line 26, omit northwestern

Page 402, line 23, after *Michigan* add: , and southern Illinois

Crataegus fecunda

Page 405, line 15, for *St. Claire* read *Claire*

Crataegus Palmeri

Page 408, line 11 from bottom, after *McDonald County* insert: , to southeastern Kansas and northwestern Arkansas

Crataegus erecta

Page 409, line 13, omit: Illinois

line 14, for east read East and for *Kahokia* read *Cahokia* and after *Kahokia*) insert: to Richland County, and southern Illinois and southern Indiana

line 15, after *Missouri* insert: , and western and southwestern Arkansas

Crataegus acutifolia

Page 410, line 6, omit Illinois

line 7, for *Kahokia* read *Cahokia* and after *Kahokia*) insert: , and in Richland County, Illinois, western Tennessee and to the neighborhood of Fayetteville, Arkansas

Crataegus unica

Page 413, line 8, after *Polk County*) insert: , to southwestern Arkansas

Crataegus Engelmannii

Page 414, line 18, after *Arkansas* add: southern Illinois, western Kentucky and Hot Spring and Van Buren Counties, Arkansas.

Crataegus edita

Page 417, line 18, before *Louisiana* insert: and to the neighborhood of Shreveport,

Crataegus fastosa

Page 427, line 6 from bottom, for *Hemstead* read *Hempstead*

Crataegus verruculosa

Page 429, line 13, *after* Missouri *insert*: Hot Spring, Garland County, and Hempstead and Miller Counties, Arkansas;

Crataegus aestivalis

Page 435, lines 22 and 24, *for* Valusia *read* Volusia

Crataegus rufula

Page 436, line 22, *for* at midsummer *read* in spring and early summer

Crataegus opaca

Page 437, line 23, *for* Forest *read* Forrest

Crataegus viridis

Page 439, line 15, *after* (Butler County), *add*: southeastern Kansas,

Crataegus glabriuscula

Page 441, last line, *before* Texas *insert*: and in Tarrant County,

Crataegus blanda

Page 442, line 9 and 8 from bottom, *for* near Fulton, Hempstead County, Arkansas *substitute*: ; central Arkansas to the valley of the Brazos River, Texas (Columbia and Brazoria) and to Menden, Louisiana, and Selma, Alabama.

Crataegus velutina

Page 443, line 16, *for* Texacana *read* Texarkana
line 17, *after* Texas *add*: and eastern Louisiana

Crataegus nitida

Page 445, line 23, *after* County *insert*: and to Shawneetown, Gallatin County *and after* Illinois *insert*: to Hannibal, Missouri, and in eastern Arkansas to Helena, Phillips County

Crataegus mitis

Page 446, line 16, *after* County *insert*: and Richland County

Crataegus disjuncta

Page 453, line 7, *after* Missouri *add*: , and to Heber Springs, Cleburne County, and Fayetteville, Washington County, Arkansas

Crataegus lucorum

Page 460, line 19, *for* Thompkins *read* Tompkins

Crataegus mollis

Page 465, line 15, *omit* and *and after* Kansas *insert*: , and Richland County, Illinois

Crataegus invisa

Page 469, line 14, *after* Arkansas *insert*: ; Hugo, Choctaw County, Oklahoma, and to San Augustine, San Augustine County, Texas.

Crataegus induta

Page 477, line 23, *before* Arkansas *add*: to Texarkana, Miller County, and Prescott, Nevada County,

Crataegus quercina

Page 479, line 19, *before Texas insert*: Rosenberg and Richmond, Fort Bend County, Wharton, Wharton County, and San Augustine, San Augustine County

Crataegus pyriformis

Page 479, line 20, *for Crataegus pyriformis Britt. read Crataegus dispersa Ashe*

line 21, add as synonym: *Crataegus pyriformis Britt.*

Crataegus lanuginosa

Page 481, line 5, *after County add*: , to Gum Springs, Clark County, Arkansas

Crataegus noelensis

Page 488, line 17, *before Missouri insert*: and Galena, Stone County and *after Missouri add*: and to Rogers, Benton County, Arkansas.

Crataegus pedicellata

Page 495, line 16, *for Munroe read Monroe*

Crataegus Holmesiana

Page 496, line 27, *for Claire read Clair*

Crataegus acclivis

Page 497, line 11, *for Munroe read Monroe*

Crataegus coccinioides

Page 504, line 10, *for Missouri read to southwestern Missouri and to Farmington, Washington County, Arkansas*

Crataegus rotundifolia

Page 505, line 6 from bottom, *for Essex read Erie*

Crataegus Margaretta

Page 507, line 2, *after lobes insert a semicolon and remove comma after May*

Crataegus consanguinea

Page 520, line 10, *for western read middle*

Crataegus apiifolia

Page 531, line 15, *for Lafayette read Dixie*

Crataegus spathulata

Page 533, line 16, *for Tanney read Taney*

Crataegus brachyacantha

Page 534, line 19, *for Ashtown read Ashdown*

MACRACANTHAE

Page 535, line 6 in *Conspectus*, *after obovate, insert fruit*

Crataegus Deweyana

Page 540, line 16, *for Thompkins read Tompkins*

Crataegus gemmosa

Page 542, line 14, *for Munroe read Monroe*

Crataegus macracantha

Page 545, line 13, *for* (Barrington County) *read* (Barrington, Cook County)

Prunus nigra

Page 561, line 14 from bottom, *after* Michigan *insert*: northern Indiana
(C. C. Deam)

Prunus americana

Page 563, line 7, *for* western *read* middle

Prunus hortulana

Page 568, line 24, *for* Missouri *read* and to northeastern Missouri and
southeastern Kansas

Prunus pennsylvanica

Page 571, last line, *after* Michigan *insert*: northern Indiana,

Prunus virginiana

Page 574, line 14, *for* northeastern *read* northern

Prunus virginiana var. **demissa**

Page 574, line 2 from bottom, *after* Iowa *insert*: Stark County, Illinois
(V. H. Chase), Laporte County, Indiana (C. C. Deam),

Prunus australis

Page 578, line 5, *for* Conecut *read* Conecuh

Prunus caroliniana

Page 580, line 8, *for* T. B. Harbison *read* T. G. Harbison

Chrysobalanus icaco

Page 584, line 23, *for* Caloosahatchie *read* Caloosahatchee

Cercis canadensis

Page 604, line 22, *before* western *add to*

Gymnocladus dioicus

Page 607, line 19, *for* southwestern *read* northern and western
line 21, *for* Eastern *read* eastern

Gleditsia triacanthos

Page 609, line 12, *for* western *read* middle and *after* Florida *insert*: (St.
Marks, Wakulla County)

line 17, *after* form in *insert*: in Richland County, Illinois, and

Gleditsia texana

Page 609, line 20, *add as a synonym* *Gleditsia brachycarpa* Nutt., not
Pursh

Page 610, line 8, *for* Only in a single grove *read* In a group

line 9, *after* Texas *add*: ; Louisiana, near Shreveport, Caddo
Parish (R. S. Cocks, 1907); Mississippi, Yazoo City, Yazoo
County (S. M. Tracey, 1911); Indiana (Knox and Gibson
Counties, J. Schneck, Plant World, vii. 252 [1904]), Gibson
County (C. C. Deam, 1921)

Perhaps best considered a hybrid between *G. triacanthos*
and *G. aquatica*.

Gleditsia aquatica

Page 611, line 1, *after* states *insert*: except in Alabama
line 3, *for* at La Pointe, Saint Charles County *read* southeastern

Sophora affinis

Page 618, line 20, *for* the valley of the Arkansas River *read* to southwestern

Cladrastis lutea

Page 619, line 5 from bottom, *for* Forsythe *read* Forsyth *and after* Taney County *add* Galena, Stone County *and after* Missouri *add*: , to northern and central Arkansas

Robinia Pseudoacacia

Page 624, line 16, *after* Illinois *add*: and westward to the Ozark region of southern Missouri, Arkansas and Oklahoma
lines 17 and 18, *omit*: perhaps indigenous as a low shrub in northeastern and western Arkansas and in Oklahoma;

Robinia viscosa

Page 626, line 15, *for* 3000 *read* 4000

Ichthyomethia piscipula

Page 630, line 12, *for* commonest of the *read* common
line 14, *for* Creek *read* River

MALPIGIACEAE

Page 631, line 5 from bottom, *for* MALPIGIACEAE *read* MALPIGHIA-CEAE

Byrsonima lucida

Page 633, line 11, *for* sandy *read* limestone

Bursera Simaruba

Page 647, line 11, *for* Plagida, De Sota County *read* Placida, Charlotte County

Cotinus americanus

Page 658, line 17, *omit*: on the Cheat Mountains, eastern Tennessee;

Metopium toxiferum

Page 659, line 11 from bottom, *after* lenticels *insert*: ; or often a shrub flowering when only a few feet tall.

Rhus typhina

Page 662, line 3, *omit*: to northern Georgia and Mississippi

Rhus copallina

Page 663, line 18, *after* New England *insert*: southward to eastern Kentucky, Tennessee and

Rhus vernix

Page 664, line 10, *for* northern New England to northern Florida and *read* Quebec south to Sebring, Highlands County, Florida
(R. M. Harper)

Cliftonia monophylla

Page 668, line 15, *for* swamps almost submerged for several months of the year *read* alluvial swamps and bays free from mud, lime, sulphur and salt

Ilex opaca

Page 670, line 7, *for* southern Indiana and Illinois to the shores of the Gulf of Mexico and through Missouri *substitute*: southeastern Missouri and eastern and southern

Ilex Cassine

Page 671, line 4, *for* southeastern Virginia *read* South Carolina

Ilex vomitoria

Page 672, line 6, *after* water *add*: (in Alabama northward to Autauga County)

Ilex decidua

Page 673, line 7 from bottom, *after* southern *add*: and eastern (St. Louis, Pike and Marion Counties) *and after* Illinois *insert*: and southwestern Indiana (common in bottoms, Posey County, C. C. Deam)

Evonymus atropurpureus

Page 676, line 14, *after* Tennessee *insert*: and
line 15, *omit*: and western Florida

Page 681, *in key before* A. *spicatum* *insert* 3; *and before* pennsylvanicum *insert* A.

Acer glabrum

Page 683, line 19, *for* East *read* east

Acer spicatum

Page 686, line 13, *omit*: to northern Georgia

Page 688, line 19 from bottom, *for glabrum* *read glaucum*

Acer saccharum

Page 689, line 18, *for glabrum* *read glaucum*

line 7 from bottom, *after* states *add*: . A form of columnar habit (var. *monumentale* Schwerin) is occasionally cultivated.

Acer floridanum

Page 692, line 14, *for* St. Augustine *read* San Augustine

line 15, *FOR fillipes* *READ villipes* *AND FOR Walker* *READ Wake*

Acer saccharinum

Page 695, line 13, *after* 3-lobed *add*: rarely laciniately divided (var. *Wieri* Schwerin)

Page 696, line 17, *after* Florida *insert*: (valley of the Apalachicola River)

Acer rubrum

Page 697, line 8 from bottom, *for* (banks of the Miami River, Dade County, on the east coast and to Cypress Swamps east of Everglade, Lee County, on the west coast) *read* (near the neighborhood of Fort Lauderdale, Broward County, R. M. Harper)

Page 697, line 10 from bottom, *after* stocks. *add*: A form of fastigiate habit (var. *columnare* Rehd.) is occasionally cultivated.

Acer rubrum var. tomentosum

Page 698, line 10, *after* Mississippi; *insert*: Crawford and Duvois Counties, Indiana, near Olney, Rutland County, and in Richland, Wayne and Johnson Counties, Illinois;

Acer rubrum var. tridens

Page 699, line 13, *after* Missouri, *add* Arkansas,

Aesculus Pavia

Page 708, line 4 from bottom, *for* Suwanee *read* Suwannee *and for* Lafayette *read* Dixie

line 5 from bottom, *for* western *read* middle

Aesculus discolor

Page 709, line 5 from bottom, *for* Comal Springs, New Braunfels *read* Comal, Comal

Sapindus marginatus

Page 714, line 1, *for* peninsular and Manatee *read* peninsula and Manatee

Sapindus Drummondii

Page 714, line 6 from bottom, *after* Texas *insert*: southern Colorado,

Rhamnus caroliniana

Page 725, line 2 and 3, *omit*: southern Iowa and southeastern Nebraska
line 4, *for* Ardman *read* Carter

Tilia floridana

Page 737, line 10 from bottom, *for* Ashe *read* Small

Tilia caroliniana

Page 740, line 13, *before* Tilia caroliniana *insert*: 9.

Tilia georgiana

Page 748, line 21, *after* Florida *add*: ; Magnet Cove, Hot Spring County, Arkansas (E. J. Palmer)

Gordonia lasianthus

Page 752, line 16, *for* southeastern Virginia *read* South Carolina (Camden, Kershaw County, and Bluffton, Beaufort County)

Gordonia alatanaha

Page 753, line 13, *for* Often *read* Occasionally

Canella winterana

Page 754, line 8, *for* Munroe *read* Monroe

Creus giganteus

Page 759, line 25, *for* valley of Bill Williams River through central and southern Arizona to the valley of the San Pedro River and to the eastern border of the Colorado Desert between the Needles and Yuma *read* valley of the San Pedro River through central and southern Arizona to the valley of the Colorado River between Needles and Yuma

Rhizophora Mangle

Page 764, line 11 from bottom, *for* Mosquito Inlet *read* Indian River and
for Cedar Keys *read* shores of Tampa Bay

Conocarpus erecta

Page 767, line 6, *for* Cedar Keys *read* shores of Tampa Bay

Laguncularia racemosa

Page 768, line 12 *for* from Cape Canaveral and Cedar Keys *read* from
Manatee County on the west coast and Brevard County on
the east coast

Aralia spinosa

Page 778, line 23, after Club. *add* Prickly Ash.

Nyssa sylvatica

Page 781, line 19 from bottom, *for* southeastern *read* southern

Nyssa ogeche

Page 782, line 2 from bottom, *for* rarely 60°–70° high with 1 or several
stems occasionally 2° in diameter *read* usually not more than
30° high with one or several stems 2°–3° in diameter, or often
only a shrub, and with

Page 783, line 13, *after* borders *insert*: and ponds *and before* South *insert*:
southern

line 14, *for* through the valley of the lower Ogeechee River,
Georgia *read* widely and generally distributed in the Altamaha
region of eastern Georgia (*R. M. Harper*)

Nyssa aquatica

Page 784, line 11 from bottom, *omit*: and southern

Cornus alternifolia

Page 790, line 18, *after* northern states *insert*: to Iowa and southern Mis-
souri (Monteer, Shannon County)

line 19, *for* northern Alabama *read* Alabama to Covington
County

ERICACEAE

Page 791, line 7, *for* Lyonia *read* Xolisma

Kalmia latifolia

Page 795, line 11 from bottom, *for* Martin *read* Clark, Perry
line 2 from bottom, *for* western *read* middle

Oxydendrum arboreum

Page 797, line 5, *for* Norfolk *read* Accomac

Lyonia ferruginea

Page 798, line 1, *for* Lyonia ferruginea Nutt. *read* Xolisma ferruginea
Hell.

line 2, *for* Xolisma ferruginea Hell. *read* Lyonia ferruginea Nutt.

Page 799, *for* A *after* 3 of key *read* A

Arbutus texana

Page 801, line 13, *for* Guadalupe *read* Guadalupe

Vaccinium arboreum

Page 803, line 10 from bottom, *for* Caloosahatchie *read* Caloosahatchee

Jacquinia keyensis

Page 805, line 14 from bottom, *after* soil *insert*: or silicious sand

Ardisia paniculata

Page 806, line 25, *for* Ardisia paniculata Nutt. *read* Ardisia escallonioides Cham. & Schlecht. and add as synonym *Ardisia paniculata* Nutt.

Page 807, line 26, *after* Florida *insert*: usually in low damp hammocks
line 27, *after* coast *insert*: , ranging northward in the interior to
Lake Okeechobee (*R. M. Harper*);

Rapanea guianensis

Page 808, line 8 from bottom, *after* keys *insert*: , ranging in the interior
northward to Lake Okeechobee
line 9 from bottom, *after* Florida *insert*: usually in low damp
hammocks

Bumelia lanuginosa

Page 814, line 18, *omit*: western
lines 20 and 21, *omit*: (near Mound City, Pulaski County)

Bumelia lycioides

Page 816, line 16, *omit*: western *and after* Arkansas *insert*: (Helena, Phillips
County, and McNab, Hempstead County)

Chrysophyllum oliviforme

Page 818, line 2 from bottom, *for* Caloosahatchie *read* Caloosahatchee

Diospyros virginiana

Page 822, line 8 from bottom, *after* In *insert*: southeastern Illinois,

Diospyros texana

Page 824, line 16, *omit* San Saba, Lampasas and *and for* Bexar *read* Brown
line 17, *for* Counties *read* County
line 18, *for* western and southern *read* southwestern

STYRACEAE

Page 824, line 22, *for* STYRACEAE *read* STYRACACEAE

Halesia

Page 825, line 12 *for* is confined to *read* inhabits; *and after* States *add*: and
eastern China.

Halesia carolina

Page 826, line 24, *for* and Mount Vernon Counties *read* County to western
Kentucky and southern Illinois (near Metropolis, Massac
County)

Halesia monticola

Page 827, line 6 and 7, *for* ; Heber Springs, Carroll County, Arkansas *read*
to Arkansas and eastern Oklahoma

Halesia diptera

Page 829, line 17, *for* western *read* middle
line 19, *omit*: and to southwestern Arkansas (Miller County)

Styrax grandiflora

Page 829, line 3 from bottom, *for* grandiflora *read* grandifolia

Symplocos tinctoria

Page 832, line 18 from bottom, *for* usually along the borders of Cypress swamps *read* in hammocks and bluffs

Fraxinus cuspidata

Page 835, line 5, *for* Western *read* western

Fraxinus caroliniana

Page 839, line 5, *FOR R. H. READ R. M. AND FOR FOREST READ Forrest*

Fraxinus pauciflora

Page 839, last line, *omit* southern

Fraxinus americana

Page 841, line 6, *for* crassifolia *read* subcoriacea

Page 842, line 11, *after* Nebraska, *add*: Missouri and Arkansas
line 24, *for* Munroe *read* Monroe

Fraxinus biltmoreana

Page 844, line 10, *for* southern *read* northern

Fraxinus nigra

Page 853, line 35, *insert* and *before* central and *change* comma *after* Iowa *to* period and *omit* line 36

Chionanthus virginica

Page 856, line 19 from bottom, *after* Pennsylvania *add*: to northeastern Kentucky, and

Osmanthus americanus

Page 858, line 6, *for* in moist soil *read* in hammocks and other places protected from fires
lines 8 and 9, *for* the valley of the Kissimmee River, the interior of the peninsular (Lake and Orange Counties) and *read* Lake and Orange Counties

Cordia Sebestena

Page 860, line 4, *for* Munroe *read* Monroe

Pinckneya pubens

Page 877, line 2, *for* to the valley of the lower Apalachicola River *read* from Leon to Washington County

Guettarda elliptica

Page 880, last line, *before* tree *insert* slender and *after* Florida *insert* in hammocks

Page 881, line 4, *after* leaf-scars *insert*: ; or often a shrub
line 9, *after* Florida *insert*: on the Everglade Keys (Royal Palm Hammock), and

Sambucus Simpsonii

Page 883, line 1, add as synonym: *Sambucus intermedia* Small, not Carrière.
line 3, after leaflets, add frequently deciduous,

Viburnum prunifolium

Page 890, line 7, after Ohio to insert: central Michigan,

Page 899, add *Abies arizonica*, 54

for *Abies balsamea* var. *hudsonica* read *Abies balsamea* var. *hudsonia*

add *Abies lasiocarpa* var. *arizonica*, 53

add *Acer rubrum* var. *columnare*, 698

add *Acer saccharinum* var. *Wieri*, 695

for *Acer saccharum* var. *glabrum* read *Acer saccharum* var. *glaucum*

add *Acer saccharum* var. *monumentale*, 689

for *Anona* read *Annona*; for *Anona Cherimolia* read *Annona cherimola*

add *Ardisia escallonioides*, 806

for *Ardisia paniculata* READ *Ardisia paniculata*

Page 900, add *Betula alleghaniensis*, 207

Page 903, for *Fraxinus americana* var. *crassifolia* read *Fraxinus americana* var. *subcoriacea*

Page 904, for *Juniperus utahensis* var. *megalanocarpa* read *Juniperus utahensis* var. *megalocarpa*

add *Liriodendron Tulipifera* var. *pyramidata*, 352

FOR *Lyonia ferruginea* READ *Lyonia ferruginea*

Page 905, for *Malpigiaceae* read *Malpighiaceae*

Page 906, add *Paurotia*, 105 and *Paurotia Wrightii*, 106

add *Pinus Elliottii*, 15

for *Populus McDougallii* read *Populus MacDougalii*

Page 907, for *Populus tacamahacca* read *Populus tacamahaca*

add *Quercus obtusata*, 261

FOR *Quercus rhombica* READ *Quercus rhombica*

Page 908, for *Quercus Robur* read *Quercus robur*

for *Quercus stellata* var. *Margaretta* f. *stonolifera* read *Quercus stellata* var. *Margaretta* f. *stolonifera*

Page 909, add *Sambucus intermedia*, 883

for *Styrax grandiflora* read *Styrax grandifolia*

insert *Taxodium ascendens*, 65

FOR *Taxodium distichum* var. *imbricarium* READ *Taxodium distichum* var. *imbricarium*

Page 910, for *Tillia pubescens* read *Tilia pubescens*

add *Ulmus floridana*, 309

FOR *Xolisma ferruginea* READ *Xolisma ferruginea*

OMIT *Zolisma ferruginea*, 798

NEW SPECIES, VARIETIES AND COMBINATIONS FROM THE HERBARIUM AND THE COLLECTIONS OF THE ARNOLD ARBORETUM.

ALFRED REHDER

Taxodium ascendens f. nutans, comb. nov.

Cupressus disticha β. *nutans* Aiton, Hort. Kew. iii. 372 (1789).

Cupressus disticha β. *pendula* John Miller, Bristol Nurs. 7 (1826), name only.

Taxodium distichum β. *nutans* Sweet, Hort. Brit. 327 (1827).—Loudon, Arb. Brit. iv. 2481, fig. 2336–2338 (1838).—Endlicher, Syn. Conif. 68 (1847).

Schubertia disticha 2. *pendula* H. K. apud Loudon, Hort. Brit. 388 (1830).

Glyptostrobus pendulus Endlicher, Syn. Conif. 71 (1847).—Hooker in Bot. Mag. xciii. t. 5603 (1866).

Taxodium distichum pendulum s. *nutans* Wenderoth, Pflanz. Bot. Gärt. I. Conif. 48 (1851).

Taxodium sinense Gordon, Pinetum, 309 (1858).

Cupressinata disticha pendula, Nelson, Pinac. 62 (1866).

Taxodium distichum pendulum Carrière, Traité Conif. ed. 2, 182 (1867).—Beissner, in Mitteil. Deutsch. Dendr. Ges. xvi. 107, 2 figs. (p. 108, 110) (1907); Handb. Nadelholz. ed. 2, 467, fig. 114 (1909).—Horsley in Horticulture, ser. 2, iii. 446, fig. (1925).

Taxodium adscendens var. *pendulum* Schneider in Silva Tarouca, Uns. Freiland-Nadelh. 274 (1913).

This form of *Taxodium ascendens* Brongn. (*T. distichum* var. *imbricarium* Croom) differs from the type only in its more or less pendulous or recurved ends of the branches and in the also more or less pendulous slenderer branchlets. The illustrations cited show this character very distinctly except Hooker's figure which is of stiffer habit. It was first described by Aiton in 1789 as *Cupressus disticha* var. *nutans*, but this name was applied later under *T. distichum* by Carrière and other authors to a different plant apparently a form of the true *T. distichum* with slenderer and slightly pendent branches.

Pinus tabulaeformis Hort. apud Carrière, Traité Conif. ed. 2, 510 (1867).—Fortune ex Gordon, Pinetum, ed. 2, 241 (1875), as a synonym of *P. Massoniana*.

Pinus sinensis Mayr, Fremdl. Wald. & Parkb. 349, fig. 113 (1906), in part.—Shaw in Sargent, Pl. Wilson. ii. 15 (1914); Gen. Pinus, 60, t. 23, fig. 201–207 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923).—Dallimore & Jackson, Handb. Conif. 451, fig. 99 (1923).

Pinus Cavendishiana Hort. ex Dallimore & Jackson, l.c. (1923), as a synonym. For further synonyms and literature see Shaw in Sargent, Pl. Wilson. ii. 15 (1914) under *P. sinensis*.

This Pine has often been confused with *Pinus Massoniana* Lamb. and by many authors has been identified with *P. sinensis* Lamb., but a careful scrutiny of Lambert's description and figure leads to the conclusion that his species is identical with his *P. Massoniana* which was based on a sterile specimen of a tree cultivated in South Africa, whence it was introduced from China. The special habitat of Lambert's *P. sinensis* also is not known as it is based on a Chinese drawing, which, however, was apparently faithfully executed, and there can be little doubt that Lambert's plate

represents the common Pine of southeastern China now generally identified with *P. Massoniana* to which it had been already referred by Parlatore (in De Candolle, Prodr. xvi. pt. II. 389 [1868]). The figure agrees with *P. Massoniana* in its long and very thin leaves in fascicles of two and in the usually stalked cones with flattened unarmed apophyses mostly or partly about as broad as high, while *P. tabulaeformis* Carr. at least in the form of eastern China which was at Lambert's time the only part of China known, differs in its much stouter and shorter leaves sometimes in clusters of three and in the usually sessile cone with more or less raised apophyses distinctly broader than higher at least on the upper part of the cone.

Pinus tabulaeformis Carr. is based on cultivated plants raised from seed introduced about 1862 to England from China. There can be little doubt that this refers to Fortune's introduction of a Pine from Peking of which mention is made in Gardeners' Chronicle of 1863 in a note which reads partly: "Mr. Fortune's Chinese plants.—A portion of these was sold the other day by Mr. Stevens . . . *Pinus Bungeana* . . . ; a Thuja and a Pinus, from the neighborhood of Peking." I have found no evidence that Fortune himself suggested or published the name *P. tabulaeformis*, though in 1875 the name is quoted in Gordon's Pinetum (p. 241) as *P. tabulaeformis* Fortune under the synonyms of *P. Massoniana*. Fortune himself does not mention this Pine in his Narrative of a journey to the capitals of Japan and China where he describes his visit to Peking in 1861; he only mentions and figures *P. Bungeana*. Carrière, however, must have received the seeds or plants under the name *P. tabulaeformis* as his citation "Hort." shows and probably at the same time a note on the habit of the mature tree in its habitat. On the strength of all this evidence we have to consider the neighborhood of Peking as the type locality of the species and credit it to Carrière who published the first description.

The taking up of Carrière's name makes necessary the following new combination:

***Pinus tabulaeformis* var. *densata*, comb. nov.**

Pinus densata Masters in Jour. Linn. Soc. xxxvii. 417 (1906).—Shaw in Sargent, Pl. Wilson. I. 2 (1911).—Patschke in Bot. Jahrb. xlviii. 658 (1912).

Pinus prominens Masters in Jour. Linn. Soc. xxxvii. 417 (1906).—Patschke in Bot. Jahrb. xlviii. 658 (1912).

Pinus sinensis var. *densata* Shaw in Sargent, Pl. Wilson. II. 17 (1914); Gen. Pinus, 60, t. 23, fig. 201 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923).—Dallimore & Jackson, Handb. Conif. 451 (1923).

CHINA: western Szechuan.

Pinus yunnanensis Franch. referred by Shaw as a variety to *P. sinensis* differs considerably from typical *P. tabulaeformis* and is probably best retained as a distinct species; it is easily distinguished by the longer and slenderer leaves prevailing in fascicles of three, by the usually larger cones with flattened, not or slightly ridged apophyses and with impressed or scarcely elevated umbos and by its less regular habit with the lower branches often distinctly pendulous.

***Clematis chiisanensis* Nakai var. *carunculosa*, comb. nov.**

Clematis alpina var. *carunculosa* Gagnepain in Rev. Hort. 1915, 535, fig. 162.—
Mottet, Arb. Arbust. Orn. 18, fig. 4 (1925).

KOREA.

This variety differs from the type chiefly in the peculiar mucronate appendages arising at the base of the sepals from the prominent ribs and forming a kind of involucre at the base of the sepals. The leaves are pubescent above and glabrous beneath and the flowers are yellow flushed purple. The variety was introduced into cultivation from Korea by Maurice L. de Vilmorin in 1908.

***Ribes odoratum* Wendl. f. *xanthocarpum*, forma nov.**

A typo recedit fructu luteo.

Cultivated at the Arnold Arboretum under no. 7960 (plant received in 1907 from D. Desmond, Boston & Maine R. R.); type specimens in herbarium collected May 11, 1912, July 22, 1918 and July 22, 1922.

This yellow-fruited form is not to be confused with the yellow-fruited *R. aureum chrysocum* Rydb. from which it is easily distinguished by its more vigorous habit, the larger leaves, those of vigorous shoots truncate to subcordate at base, the finely but densely pubescent branchlets, petioles and rhachis of inflorescence and by the longer corolla-tube, 2 to 3 times as long as the sepals.

***Exochorda racemosa* Rehd. var. *dentata*, var. nov.**

Exochorda dentata Hort. Chenault.

A typo recedit ramulis, petiolis, costa foliorum et rhachi racemi tenuiter et sparse villosis, foliis turionum apice distinctius et grossius serratis.

Cultivated at the Arnold Arboretum under no. 7470 (plant received in 1913 from Léon Chenault & fils, Orleans, France); specimens in herbarium collected May 16, 1918, May 18, 1919 and June 8, 1925.

This variety differs from the type which is quite glabrous in the slight pubescence of the young branchlets, petioles, rhachis of the raceme and the midrib of the under side of the leaf and in the coarser serration of the leaves on vigorous shoots. *Exochorda serratifolia* Moore which might be confused with this variety on account of its pubescence, has the leaves sparingly pubescent on the whole under surface, larger, up to 5 cm. broad, and serrate to below the middle and the flowers have about 25 stamens.

***Malus brevipes*, spec. vel hybr. nov.**

Malus floribunda var. *brevipes* Rehder in Jour. Arnold Arb. 11, 50 (1920).

When I first described this plant I expressed doubts whether it should be considered a variety of *M. floribunda* but finding no good morphological characters to separate it from that species, I thought it best to consider it a variety. Extended observations, however, have convinced me that it is not very closely related to *M. floribunda* and that it is better to give it specific rank. Unfortunately neither of *M. floribunda* nor of *M. brevipes*

do we know the origin; they have not been found wild and are not known at present in Japanese gardens, though *M. floribunda* is supposed to have been introduced from Japan by Siebold about 1862.

Malus brevipes differs from *M. floribunda* in its more upright stiffer habit, in the closer and sharper serration of the leaves with spreading not accumbent teeth, in the generally ovate-oblong shape of the leaves of the shoots and the shorter petioles, in the smaller paler flowers on shorter pedicels, in the more deeply divided styles and in the larger, slightly angled fruit with deeper scar and harder flesh shrivelling after maturity, not becoming soft and pulpy, and borne on upright or nearly upright pedicels about 1 cm. long. It usually fruits profusely and is particularly distinct in autumn with its upright or nearly upright red fruit.

× *Malus zumi* var. *calocarpa*, comb. nov.

Malus Sieboldii var. *calocarpa* Rehder in Sargent, Pl. Wilson. II. 294 (1915).

Pyrus Sieboldii var. *calocarpa* Bailey in Rhodora, XVIII. 155 (1916); in Bailey, Stand. Cycl. Hort. v. 2874 (1916).

As I stated under the original description, this Crabapple shows some resemblance to *M. zumi* Rehd. which is probably a hybrid between *M. baccata* var. *mandshurica* Schneid. and *M. Sieboldii* var. *arborescens* Rehd. Continued observation of this form have convinced me that it really is more closely related to that hybrid than to *M. Sieboldii* Rehd. It has the same large white flowers and the leaves of the flowering branchlets are often entire as in *M. zumi* or only slightly crenate-serrate, also the serration of the leaves of the shoots is shallower and more crenate and only the upper leaves of the shoots are shallowly lobed, never as deeply as in *M. Sieboldii*. It blooms ten or twelve days earlier than *M. Sieboldii* and about the same time as *M. zumi*. From typical *M. zumi* this variety differs chiefly in the darker red color of the flower buds and in the prevailing 3-4 styles of its flowers, while *M. zumi* has often five styles; by these characters it approaches *M. Sieboldii*, one of its supposed parents.

Malus Halliana var. *spontanea*, comb. nov.

Malus floribunda var. *spontanea* Makino in Tokyo Bot. Mag. XXIV. 67 (1910).

Malus spontanea Makino, l.c. XXVIII. 295 (1914).

JAPAN: Kyushu Islands.

About six years ago Mr. Wilson brought a living plant of *Malus spontanea* Mak. from Japan which is now growing at this Arboretum and has flowered and fruited. A comparison of the living plant with *M. Halliana* Koehne shows that there are no good morphological characters to separate these two species and that Makino already had recognized its true affinity, when he described it as *M. floribunda* var. *spontanea*, for the plant he considered *M. floribunda* was *M. Halliana*, not *M. floribunda* Sieb. which is unknown in Japan. The variety differs from *M. Halliana* in its denser and stiffer habit, somewhat broader and smaller leaves, slightly smaller flowers pinkish in bud, but white when fully open and in the less deeply colored pedicels and calyx.

If we consider the two plants as belonging to one species, *M. Halliana* must be taken as a cultivated form of *M. spontanea* which is a native of Mt. Kirishima, Kyushu Islands, and the question of the origin of *M. Halliana* is solved. It seems strange, however, that *M. Halliana* should be cultivated in Yunnan, being represented in our herbarium by specimens collected by E. E. Maire and by C. Schneider, though it is not known from any other part of China, nor has it been found wild in China, for Wilson's no. 4172 referred by me (in Sargent. Pl. Wilson. II. 285) to *M. Halliana* is *M. theifera* Rehd. as a re-examination of the specimen has shown.

***Malus prunifolia* var. *rinki* f. *fastigiata*, forma nov.**

A typo varietatis recedit ramis adscendentibus erectis comam columnarem formantibus, pedicellis brevibus 8–16 mm. longis et fructu depresso-globoso.

Cultivated at the Arnold Arboretum under no. 8217 (raised from seed received from U. S. Dept. of Agriculture under no. 17887); specimens in this herbarium collected May 10 and October 5, 1922, and May 14, 1923.

This is a very striking form on account of its erect branches which form a rather narrow columnar head. The tree is now about 5.5 m. tall, branching from near the base, with a crown about 1.8 m. in diameter. The leaves are elliptic, crenate-serrate and quite glabrous at maturity; the flowers are white and about 4 cm. across. The fruit is depressed-globose or sometimes slightly pear-shaped, 1.5–2 cm. high and 1.8–2.4 cm. across, dark purple-red, and borne on stout pedicels 8–16 mm. long; the calyx is scarcely raised, but is usually thickened and gibbous at the base.

According to F. N. Meyer's note accompanying the seed the fruit was bought on the street in Peking (see U. S. Dept. of Agriculture, Bur. Pl. Indust. Bull. cvi. Invent. Seeds Pl. Imp. XII. 57 [1907]).

× *Malus robusta* f. *erecta*, forma nova.

A typo recedit ramis ascendentibus comam angustam fere columnarem formantibus.

Cultivated: Arnold Arboretum under no. 8218 (raised from seed brought in 1904 by C. S. Sargent from Peking); specimens in this herbarium collected May 10 and September 25, 1922.

Like the preceding form this Crabapple assumes a columnar habit, though somewhat looser and not quite as narrow. The tree is now about 6 m. tall and the head about 2 m. in diameter. The leaves are elliptic or ovate-elliptic, 4–7 cm. long, crenate-serrate and nearly glabrous from the beginning except a slight pubescence on the midrib and veins above. The flowers are pure white, 4–4.5 cm. across, on slenderer pedicels 1.5 to 3.5 cm. long and glabrous like the calyx. The fruit is depressed-subglobose, 1.6–2.2 cm. high and 2.1–2.5 cm. across, bright red and often partly yellow, with rather mealy and sweet flesh; the calyx seems to be always present, but is sometimes rather reduced and small.

In the character of the flowers and leaves the tree agrees very well with *M. baccata* Borkh., but the fruit in its persistent calyx shows the influence of *M. prunifolia* Borkh. I therefore have treated it as a form of *M. robusta* Rehd. (*M. baccata* \times *prunifolia*).

\times *Malus purpurea* var. *aldenhamensis*, comb. nov.

Pyrus Malus aldenhamensis Gibbs in Gard. Chron. ser. 3, LXXII. 110 (1922), name only.—Kew Hand-list Trees & Shrubs, ed. 3, 131 (1925), as var., name only.

SPECIMENS EXAMINED: Arnold Arboretum, from plants cultivated under no. 13220, May 15 and September 8, 1925; Roy. Botanic Gardens, Kew, October 25, 1922 and May 27, 1925 (from plant received from Vicary Gibbs in 1917).

Nothing definite seems to be known of the origin of this handsome Crabapple designated as a chance hybrid by Vicary Gibbs. It shows, however, a great resemblance to \times *M. purpurea* Rehder supposed to be a hybrid between *M. pumila* var. *Niedzwetzkyana* Schneid. and \times *M. atrosanguinea* Spaeth (*M. Halliana* \times *Sieboldii*) and is probably either a seedling of *M. purpurea* or, what seems less likely, another hybrid of *M. pumila* var. *Niedzwetzkyana*. From *M. purpurea* it differs chiefly in the broader and thinner more glabrous leaves less reticulate-veined on the under side and somewhat more sharply and coarsely serrate, in the semi-double purple-pink flowers (pomegranate-purple according to Ridgway's Color standards, pl. XII. 71-i), the glabrous or nearly glabrous purple pedicels and calyx and in the somewhat shorter sepals. The fruit is subglobose or depressed-subglobose, 1.7-2 cm. across, deep purple-red, with persistent calyx raised and thickened at base, and is borne on pedicels about 3 cm. long. As it cannot be separated by any strong characters from *M. purpurea* it seems best to treat it as a variety of that hybrid.

\times *Malus purpurea* var. *Eleyi*, var. nov.

Pyrus Eleyi Bean in Gard. Chron. ser. 3, LXVIII. 85, fig. 37 (1920).—Anon. in Gard. LXXXVI. 241, fig. (1922).—Anon. in Gard. Chron. ser. 3, LXXII. 211, fig. 87 (1922).—Anon. in Gard. LXXXVI. 537, fig. (1922).—Eley, Gardening XXth Cent. 115, 2 t. (1923).—Anon. in Gard. LXXXVIII. 81, fig. (1924).—Macself, Flow. Trees & Shrubs, frontispiece (1924).

Malus Eleyi Hesse, Preisliste 1925/26, p. 95 (1925).

This handsome hybrid is according to Bean and Eley a hybrid of *M. pumila* var. *Niedzwetzkyana* Schneid. and *M. spectabilis* Borkh. with the former as the seed-bearer, but I am unable to see any influence of *M. spectabilis* in the plant. The plant differs from either parent in its more sharply and deeply serrate leaves and in the smaller flowers with narrower petals; the fruit is scarcely larger than that of *M. spectabilis* and the occasionally deciduous calyx points toward the influence of a species with deciduous calyx. Moreover, young free growing grafts received from Kew have produced in this Arboretum some lobed leaves similar to those of *M. Sieboldii*. This and the occasionally deciduous calyx make it probable that *M. Sieboldii* or a related species or hybrid of that species is the other

parent; also the great resemblance of this plant to *M. purpurea* which is of similar parentage points that way and therefore it seems best to refer it to *M. purpurea*; in its leaves it resembles the preceding variety, but the flowers are single and the fruits ovoid or ellipsoid with the calyx occasionally deciduous.

***Pyrus Calleryana* Dene. var. *lanceata*, var. nov.**

A typo recedit foliis ovato- vel oblongo-lanceolatis lanceolatisve minutissime crenulatis vel subintegris vel integris.

EASTERN CHINA. An w he i: Shi tai hsien, A. N. Steward, August, 1924, Herb. Univ. Nanking no. 5486 (shrub 4 m.; fruit brown, spotted, edible; type); Yu ting, N. K. Ip, August 24, 1923, Herb. Univ. Nanking, no. 4800 (tree, 10-20 ft.). Chekiang: alt. 1900 ft., open thickets, R. C. Ching, no. 2585, September 4, 1924 (shrub 20 ft.).

This is a well-marked variety and at the first glance looks like a distinct species, but the 2-celled fruit agrees exactly with that of *Pyrus Calleryana* and the differences in the leaves do not seem strong enough to base a new species upon them, though I have seen among the copious herbarium material before me from almost all parts of China and from Korea no specimen of intermediate character. They all have broad, rather abruptly acuminate, distinctly crenate leaves, while the leaves of this variety are ovate-lanceolate to lanceolate, 4-8 cm. long and 1.5-3 cm. broad, gradually acuminate, narrowed toward the rounded or broad-cuneate base, minutely crenulate as in most leaves of Steward's no. 5486, or entire or nearly entire in Ip's no. 4800 and in Ching's no. 2585. The fruits are 1.2-1.4 cm. across in Steward's specimen and smaller and borne on slenderer pedicels about 4 cm. long in Ching's specimen.

× ***Pyrus Lecontei* (*P. communis* × *serotina*), nom. nov.**

"Le Conte Pear" Anon. in Rep. Georgia Hort. Soc. VIII. 29 (1878).—Hedrick, Pears of N. Y. 187, t. (1921).

"Kieffer Pear" Meehan in Gard. Monthly, XXII. 49, fig. (1880).—Anon. in Country Gentleman, LXXXIV. 26, fig. (1919).—Hedrick, Pears of N. Y. 180, t. (1921).

"Garber Pear" Anon. in Am. Pomol. Soc. Cat. 43 (1891).—Hedrick, Pears of N. Y. 187 (1921).

The three Pears mentioned above are the best known of the hybrids between the Chinese Sand Pear and the Common Pear and as *Le Conte* is the oldest it may serve as the type of this group of hybrids, and *P. Lecontei* may be proposed as a name for the group in honor of Major Le Conte who probably raised it some time before 1850. The Kieffer Pear was raised by Peter Kieffer of Roxborough near Philadelphia some time after 1853 and bore fruit first in 1863. The Garber Pear was raised by J. B. Garber of Columbia, Pennsylvania, sometime previous to 1880. As these Pears are described in detail by Hedrick (l.c.) and the first two varieties illustrated by excellent colored plates, it does not seem necessary to give a description here.

Stranvaesia Davidiana var. **salicifolia**, var. nov.

Stranvaesia salicifolia Hutchinson in Bot. Mag. cXLVI. t. 8862 (1920).

CHINA. H u p e h: north and south of Ichang, alt. 1300–2000 m., *E. H. Wilson*, no. 382a (in herb. Arnold Arboretum), October, 1907; Lung men ho, alt. 2000 m., *W. Y. Chun*, August 23, 1922. Y u n n a n: without precise locality, *G. Forrest*, no. 17990, in 1917–19.

This plant is closely related to *S. Davidiana* var. *undulata* Rehd. & Wils. and differs chiefly in its narrower leaves with usually more numerous veins and—according to Hutchinson—red, not orange fruit, but these characters do not seem to be sufficient to separate this form as a distinct species and I therefore consider it best to reduce *S. salicifolia* to varietal rank as a second variety of *S. Davidiana* Dene. I cannot follow Cardot (in Bull. Mus. Hist. Nat. Paris, xxv. 399 [1919]) and Stapf (in Bot. Mag. cXLIX. t. 9008 [1924]) in referring *S. Davidiana* to the genus *Photinia*. In *S. Davidiana* the upper part of the ovary is free in the fruit to the middle or below the middle, in the type as well as in the varieties, and I have not seen a fruit with the ovary free only at the top as figured by Stapf in Botanical Magazine. At full maturity the ovary is easily separated from the fleshy receptacle and the valves split loculicidally and at the same time break into smaller parts by horizontal cracks as I observed in Wilson's no. 382a. Moreover, *S. Davidiana* has 5 styles like *S. nussia* Dene., while *Photinia* has only 2 or 3, very rarely 5 styles.

Rubus ulmifolius Schott var. **variegatus**, nom. nov.

Rubus ulmifolius foliis variegatis Nicholson in Kew Hand-list, ed. 2, 265 (1902), name only.—Bean, Trees & Shrubs Brit. Isles, II. 470 (1914).

A handsome form with the leaves variegated with bright yellow along the veins. Whether *R. fruticosus* 4. *variegatus* Weston (Bot. Univ. I. 341 [1770]) and *R. fruticosus* 5. *foliis variegatis* Loudon (Arb. Brit. II. 742 [1838]) belong here, I am unable to say.

× **Rubus Fraseri** (*R. odoratus* × *parviflorus*), nom. nov.

Rubus robustus G. Fraser in Gard. Chron. ser. 3, LXXIII. 51 fig. 24 (1923).—Not Presl.

This hybrid was raised by George Fraser of Ucluelet, British Columbia, from seed of *R. parviflorus* fertilized in 1918 with pollen of *R. odoratus*. It is a compact shrub with rose-colored, fragrant flowers fading to pale purple; from *R. odoratus* L. it differs in its less glandular-pubescent leaves, petioles and stems and in its lighter colored flowers, and from *R. parviflorus* Nutt. in the more acuminate lobes and the narrower basal sinus of the leaves and in the rose-colored flowers.

Prunus Petunnikowi, comb. nov.

Amygdalus Petunnikowi Litvinof in Trav. Mus. Bot. Acad. Sci. St. Petersb. I. 16 (Flor. Turkest. Fragm. 5) (1902).

A plant of this interesting and rare Almond was received in 1912 from the nursery of L. Spaeth, Berlin, Germany, but it has not yet flowered here,

though is it still alive; at Spaeth's nursery it has since died, as I have been informed upon inquiry.

Litvinof compares this species with *Amygdalus nana* L. and *A. paniculata* Pall. (apparently a misprint for *A. pedunculata* Pall.), and distinguishes it chiefly by the oblong fruit and the rostrate-apiculate oblique base of the stone, but in the absence of flowers its exact position remains uncertain. From these species, both of which are growing in this Arboretum, our plant differs in the pale yellowish color of the young branchlets and besides from *P. pedunculata* (Pall.) Maxim. in the narrower leaves with gradually decurrent base; in its leaves it closely resembles *P. nana* (L.) Stokes, but they are more distinctly oblanceolate, smaller, even on vigorous shoots not more than 3 cm. long, less pale beneath and of thinner texture.

***Glochidion dasyphyllum* K. Koch, Hort. Dendr. 85 (1853).**

Glochidion molle Hooker & Arnott, Bot. Voy. Beechey, 210 (1830).—Bentham, Fl. Hongk. 314 (1861).—Non Blume.

Bradleia mollis Steudel, Nomencl. Bot. ed. 2, 222 (1841).

Glochidion Arnottianum Mueller Arg. in Linnaea, xxxii. 60 (1863).—Hemsley in Jour. Linn. Soc. xxvi. 424 (1894).

Phyllanthus Arnottianus Mueller Arg. in De Candolle, Prodr. xv. pt. ii. 279 (1866).—Hance in Jour. Linn. Soc. xiii. 120 (1873).

EASTERN CHINA, FORMOSA, HAINAN.

The new names and new combination published by K. Koch in his *Hortus dendrologicus* which appeared in 1853 seems to have been entirely overlooked in botanical literature. I have already in an earlier part of this Journal (iv. 250) referred to the fact that *Hedera nepalensis* K. Koch should supersede *H. himalaica* Tobler and now I wish to draw attention to *Glochidion dasyphyllum* which has priority of *G. Arnottianum*.

One of the reasons that Koch's publication has been neglected until recently is probably the absence of its new names from Index kewensis, but Mr. Sprague informed me, when I drew his attention to Koch's work that these names will be incorporated in the seventh Supplement of Index kewensis.

***Evonymus radicans* var. *acuta* f. *colorata*, forma nov.**

A forma juvenili typi varietatis recedit foliis latioribus, late ellipticis vel ovato-ellipticis, distinctius serratis autumnno et per hiemem colore purpureo gaudentibus.

Cultivated in the Arnold Arboretum under no. 19357 (plant received in 1917 from U. S. Department of Agriculture under no. 37541); specimen in herbarium collected December 22, 1925.

This form of *E. radicans* Miq. differs from other evergreen species and varieties of *Evonymus* in the purple color the leaves assume in autumn and retain during the winter, the upper surface changing to a deep almost blackish purple color and the lower surface to a lighter and brighter purple. The plant in this Arboretum has not outgrown its juvenile stage and its long prostrate branches cover the ground and form a dense mat. The

plant was originally raised from seed collected by F. N. Meyer at Ya tze ko, south of Sian fu, Shensi; the original specimen, Meyer's no. 1694 collected Jan. 22, 1914, which is before me, does not seem to differ from typical *E. radicans* var. *acuta* Rehd. and is described as a woody vine on tree trunks and walls. From this it appears that our plant is apparently a form of the variety common in China and perhaps only a juvenile state, but as it possesses chiefly on account of its purple winter color decided ornamental merits, it deserves, for horticultural purposes at least, a distinct name. The juvenile form grown at this Arboretum under no. 7219 and raised from Wilson's no. 562a collected at Fang Hsien, Hupeh, differs from *E. radicans colorata* in the narrower less prominently serrate leaves remaining green during the winter, but it has the same prostrate habit and in summer appears to be scarcely different.

Evonymus Bungeana f. *pendula*, forma nov.

A typo recedit ramis ramulisque pendentibus.

Cultivated at the Arnold Arboretum under no. 8025 (received from the Park Dept. of Rochester, New York, whence it came from Spaeth's Nursery, Berlin, Germany, prior to 1904); specimen in herbarium: Rochester Park, N. Y., *J. Dunbar*, October, 1904.

This form differs in its slender pendulous branches from the type; its leaves are rather large, including the long and slender acumen up to 9 cm. long and up to 4.8 cm. broad, and borne on slender petioles up to 4 cm. long.

Vitis Kaempferi var. *glabrescens*, comb. nov.

Vitis Coignetiae var. *glabrescens* Nakai in Tokyo Bot. Mag. xxxii. 108 (1918). KOREA: Dagelet Island (Ōoryongto).

The very young leaves of this variety are fairly densely covered with a cobwebby tomentum which, however, soon is reduced to a very slight and thin covering of tomentum or retained only along the veins and veinlets. Specimens from Sapporo received from the Agricultural College of Sapporo in 1885 and also some specimens from European and American gardens seem to be identical with specimens of the Dagelet plant collected in 1917 by E. H. Wilson (nos. 8536, 8555); apparently this variety is not restricted to the Dagelet Islands. Nakai (l.c.) states that the variety in its extreme glabrous forms approaches *Vitis amurensis* Rupr., but the latter species differs in the entire absence of cobwebby tomentum, even on very young leaves which are at most covered only on the veins and veinlets with short-pilose hairs, and in the generally smaller leaves with a usually wide sinus.

Vitis Kaempferi K. Koch (Hort. Dendrol. 47 [1853]) is another of the names published by K. Koch in his Hortus dendrologicus and overlooked by later authors, like *Glochidion dasyphyllum* referred to above (p. 30 which see for further remarks). It is apparently the same species as named later *V. Coignetiae* by Pulliat. Koch based his species on *V. Labrusca* Thunb. which judging from Thunberg's description of the leaves as "sub-

triloba" is identical with *V. Coignetiae* rather than with *V. Thunbergii* Sieb. & Zucc. to which it has been, at least partly, referred by some authors; also "folia subtus ferrugineo-tomentosa" fits *V. Coignetiae* better than *V. Thunbergii*. Moreover, Koch enumerates *V. Thunbergii* as *V. ficifolia* β . *Thunbergii* (Sieb. & Zucc.) which shows that he considered *V. Labrusca* Thunb. to be his *V. Kaempferi*, and not *V. Thunbergii*.

***Tilia glabra* f. *macrophylla*, comb. nov.**

Tilia nigra var. *macrophylla* Bayer in Verh. Zool.-Bot. Ges. Wien, xii. 53 (1862).

Tilia americana 3. *laxiflora* Kirchner in Petzold & Kirchner, Arb. Muscav. 195 (1864).—Jaeger, Ziergeh. 541 (1865).—Probably not *T. laxiflora* Michx.

Tilia americana 3 f. *macrophylla* V. Engler, Monog. Tilia, 139 (1909).

Tilia macrophylla Hort. ex V. Engler, l. c. (1909), as synonym.—Neither Méral, nor Kirchner.

This form differs from the type chiefly in its very large leaves and is found in gardens under various names of uncertain application. Bayer's name is based on a specimen in the St. Petersburg Herbarium and is described as a form with very large leaves and loose inflorescence. It is probably not the *T. macrophylla* Méral (Nouv. Fl. Paris, ed. 3, ii. 451 [1834]; ed. 4, ii. 552 [1836]), erroneously referred to *T. heterophylla* by Simonkai who confused it with *T. macrophylla* Hort. cited by Spach (in Am. Sci. Nat. ser. 2, ii. 345 [1834]) as a synonym of *T. heterophylla*, but according to Méral's description his *T. macrophylla* is glabrous on both sides. Spach's *T. macrophylla*, however, may be the same as *T. macrophylla* Hort. apud Kirchner (l.c. 160).

***Tilia glabra* f. *dentata*, comb. nov.**

Tilia longifolia dentata Hort. apud Kirchner in Petzold & Kirchner, Arb. Muscav. 160 (1864).—V. Engler, Monog. Tilia, 139 (1907), as synonym of var. *megalongifolia*.

Tilia nigra 2b *incisa* Kuntze, Taschenfl. Leipzig, 210 (1867).

Tilia americana *megalongifolia* V. Engler, Monog. Tilia, 139 (1909).—Spaeth in Moeller's Deutsch. Gartn.-Zeit. xxxix. 274, fig. 2 (1924), habit figure.

Tilia incisa-dentata Hort. in part. ex V. Engler, l. c. (1909), as synonym.

This form differs from the type in its rather larger deeply and incisely often nearly doubly serrate leaves and is intermediate between the type and the following form. Of the plant cultivated as *T. longifolia dentata* I have before me two specimens; one collected in 1875 at Muenden, Hannover, from a plant obtained in 1871 from the Booth Nursery, Flottbeck, Germany, and one collected in 1888 by me at Muskau, Silesia, from a plant which without doubt was propagated from the plant in the Muskau Arboretum described by Kirchner.

***Tilia glabra* f. *ampelophylla*, comb. nov.**

Tilia americana f. *ampelophylla* V. Engler, Monog. Tilia, 140 (1909).

Tilia longidentata hort. pp. ex Engler, l. c. (1909), as synonym.

Tilia nigro-longifolia dentata hort. pp. ex Engler, l. c. (1909), as synonym.

Tilia longifolia dentata hort. pp. ex Engler, l. c. (1909), as synonym.

Tilia incisodentata hort. pp. ex Engler, l. c. (1909), as synonym.

Tilia americana var. *densiflora* f. *oenophylla* V. Engler in sched. ex V. Engler, l. c. (1909), as synonym.

A form with large leaves coarsely and deeply serrate and furnished on each side with one to three triangular lobes.

***Rhododendron carolinianum* var. *foliatum*, var. nov.**

A typo recedit corolla extus magis lepidota, labio superiore intus maculata, floribus post foliorum ortum apertis, foliis plerumque angustioribus longioribusque et saepe acuminatis, habitu altiore, quibus characteribus ad *R. minus* accedens, sed corolla rotato-campanulata nec basin versus in tubum cylindricum attenuata facile distinguitur.

NORTH CAROLINA. Macon County: along trail to Wildcat Ridge, near Highlands, *H. H. Richardson*, June 14, 1923; near Highlands, alt. 3950 ft., *T. G. Harbison*, no. 656a, July 2, 1911 and no. 47, June 14, 1918; "Corneleroft" alt. 3300 ft., *H. H. Richardson*, June 12, 1923; Macon County, alt. 3000 ft., *T. G. Harbison*, no. 202 and 203, June 8, 1919.

This variety differs from the type in its higher stature and looser habit, in the usually narrower and longer often acuminate leaves and usually less densely lepidote beneath and in the generally somewhat smaller corolla more scaly outside and its upper lip marked inside with a blotch of olive green or greenish orange dots; the flowers appear after the leaves and are often overtopped by the leafy shoots. It occurs at altitudes of from 3000 to 4500 ft. and is probably more common than the type which seems restricted to altitudes above 4000 ft.

It has been in cultivation since a long time, for there is an old plant, at least 40 years old, of this form on the old Parkman estate which now belongs to the Boston park system. In recent years it has been frequently distributed by nurserymen as *R. carolinianum*, as it grows in more easily accessible localities, but as an ornamental plant it is inferior to the type which is of more compact habit, blooms earlier and has larger flowers borne well above the foliage.

× ***Rhododendron pulchrum* var. *phoeniceum*, comb. nov.**

Rhododendron indicum γ *phoeniceum* Sweet, Brit. Flow. Gard. ser. 2, II. sub t. 128 (1832).

Rhododendron phoeniceum G. Don, Gen. Syst. III. 848 (1834).—Wilson in Wilson & Rehder, Monog. Azaleas, 61 (1921), where further citations of literature and synonyms will be found.

If *Rhododendron pulchrum* Sweet and *R. phoeniceum* G. Don which probably both are hybrids of *R. mucronatum* G. Don and *R. scabrum* G. Don are to be united under one binomial, the latter should be *R. pulchrum* which was published in 1832, while *R. phoeniceum* did not receive the rank of a species until 1834, though it appeared as a variety in 1832. Therefore *R. phoeniceum* will have to be treated as a variety of *R. pulchrum*.

× ***Rhododendron pulchrum* var. *calycinum*, com. nov.**

Azalea indica calycina Lindley in Paxton, Flow. Gard. II. 169, t. 70 (1852).

Rhododendron calycinum Planchon in Fl. des Serres, IX. 81 (1854); in Rev. Hort. 1854, 65.

Rhododendron phoeniceum var. *calycinum* Wilson in Wilson & Rehder, Monog. Azaleas, 63 (1922), where further citations of literature and synonyms will be found.

This new combination becomes necessary, since *R. pulchrum* has priority of *R. phoeniceum* as stated above.

***Syringa tomentella* var. *Rehderiana*, comb. nov.**

Syringa Rehderiana Schneider in Sargent, Pl. Wilson. II. 299 (1912); Ill. Handb. Laubholz. II. 1064 (1912).—Rehder in Bailey, Stand. Cycl. Hort. VI. 3302 (1917).

CHINA. Szechuan.

The variety differs from typical *S. tomentella* Bur. & Franch. chiefly in the tomentulose branchlets, the densely short-pilose larger inflorescence and in the leaves being slightly pubescent above and more densely so beneath particularly on the veins. It is doubtful if this variety is in cultivation.

***Syringa oblata* var. *Giraldii*, comb. nov.**

Syringa Giraldi Lemoine, Cat. no. 157, p. 35 (1904); no. 160, p. 30 (1905).—Sprenger in Mitt. Deutsch. Dendr. Ges. XVI. 68 (1907).—Bellair in Rev. Hort. 1909, 335, fig. 135–137.—Lingelsheim in Engler, Pflanzenreich, IV. 243, pt. I–II. 88 (1920), as synonym of *S. oblata* var. *affinis*.

Syringa affinis var. *Giraldi* Schneider, Ill. Handb. Laubholz. II. 774 (1911).—Rehder in Bailey, Stand. Cycl. Hort. VI. 3301 (1917).

NORTHERN CHINA.

This Lilac is probably the wild form of *S. oblata* Lindl. which is known only as a cultivated plant; it differs from the latter chiefly in its slenderer and looser habit, less compact inflorescence, longer more acuminate capsules, and smaller usually narrower and ovate leaves, truncate at base and finely soft-pubescent on sterile branchlets particularly on those near the base of the shrub and on young plants; on and near flowering branches they are usually quite glabrous as in typical *S. oblata*. On older plants pubescent leaves may be entirely absent or the pubescence may be reduced to a ciliate margin. A similar behavior can be observed in *S. vulgaris* which is usually entirely glabrous and only on wild plants ciliate leaves occasionally occur.

***Syringa oblata* var. *dilatata*, var. nov.**

Syringa dilatata Nakai in Tokyo Bot. Mag. XXXII. 128 (1918); Fl. Sylv. Kor. X. 48, t. 18 (1921).

KOREA.

This is very similar to the preceding variety and seems to differ chiefly in the long-acuminate larger and narrower leaves, on vigorous shoots sometimes narrow-ovate, rounded at base and decurrent into the petiole. This variety was introduced to the Arnold Arboretum by E. H. Wilson in 1919.

***Campsis radicans* f. *flava*, comb. nov.**

Tecoma radicans γ *flava* Bosse, Vollst. Handb. Blumengaert. III. 470 (1842).—Mouillefert, Arb. Arbriss. II. 937 (1896).

Tecoma radicans lutea Kirchner in Petzold & Kirchner, Arb. Musc. 519 (1864).—Jaeger & Beissner, Ziergeh. ed. 2, 393 (1884).

Bignonia radicans var. *lutea* Jaeger, Ziergeh. 134 (1865).

Bignonia radicans aurea, Meehan, Cat. XL. 64 (1905).

Campsis radicans var. *aurea* Hort. apud Rehder in Bailey, Stand. Cycl. Hort. II. 685 (1914); in Mitteil. Deutsch. Dendr. Ges. XXIV. (1915) 227 (1916), as forma.

According to Bosse this yellow-flowered form was offered before 1842 by J. Booth at Flottbeck, Germany.

Lonicera Ferdinandi var. *induta*, var. nov.

A typo recedit ramulis dense pube brevi et pilis setosis patentibus vestitis, foliis majoribus basi plerisque truncatis vel subcordatis, supra laxe pubescentibus, subtus dense molliterque praecipue in costa venisque pilosis, corolla pube densiore vestita.—Frutex ut videtur robustus; rami robustiores interdum stipulis semiorbicularibus praeditae. Folia ovato-oblonga, 3.5–8 cm. longa et 1.7–4.5 cm. lata, acuminata, basi truncata, majora saepe subcordata, minora saepius rotundata, supra sparse accumbenti-pilosa, subtus pilis erectis mollibus praecipue in costa et venis venulisque dense obtectis, maturitate interdum costa et basibus venarum exceptis glabrescentibus; petioli 2–5 mm. longi, dense pilosi. Pedicelli petiolis breviores, rarius aequilongi, dense pubescentes; bractae oblongo-ovatae vel ovatae, circiter 1 cm. longae, margine et ad costam subtus longe setoso-ciliatae, ceterum glabrae vel fere glabrae; cupula dense pubescens et praecipue apicem versus setoso-pilosa; corolla circiter 1.5 cm. longa, extus dense pubescens glandulis sparsis immixtis, apice sparse setoso-pilosa, tubo basi leviter ventricosus et pilis setosis brevibus reflexis instructo. Baccae fere ad maturitatem in cupula inclusae, maturitate erumpentes, rubrae.

NORTHERN CHINA. Shansi: Sheng shih ling, alt. 1500–2500 m., Tchuang Kieh, September 9, 1922, Hers no. 2059 (type); Wen fu ho valley, alt. 1200 m., October 2, 1923, Hers no. 2777. Western Shensi: Lungchow, Kuan shan, alt. 2000 m., July 3, 1928, Hers no. 2351. Honan: cultivated at Chungchow (introduced from the hills), May 1, 1923, Hers no. 2499.

This variety differs in its larger leaves densely soft-pubescent beneath and slightly pubescent above and in the densely pubescent and pilose branchlets from typical *L. Ferdinandi* Franch. and looks quite distinct in its extreme form, but in Hers' no. 2777 the leaves are pubescent only on the lower part of the midrib and of the veins beneath, and otherwise glabrous and young plants raised from seed of Hers' no. 2059 have the leaves glabrous except scattered pilose and setose hairs on midrib and veins beneath and the branchlets densely setose and not pubescent, and the plants thus resemble closely typical *L. Ferdinandi*. Therefore I considered it best in the absence of marked differences in flower and fruit to refer the plant as a variety to that species.

Lonicera trichosantha f. *glabrata*, forma nov.

A typo recedit foliis glabris vel interdum tantum ad costam sparse pilosis, corolla tantum tubo extus puberulo, limbo fere glabro vel glabrescente.

CHINA. Western Szechuan: near Tachien lu, thickets, alt. 3000 m., October, 1910, E. H. Wilson, no. 856 (type). Yunnan: without precise locality, G. Forrest, no. 13948. Southeastern Tibet: without precise locality, G. Forrest, nos. 14296, 19073.—Cultivated: Arnold Arboretum under no. 5973 (received from Veitch in 1907 under Wilson no. 1744), August, 1908, August, 1910,

June 15, 1914, August 12, 1916, June 10, 1925; Hort. Veitch (under Wilson. no. 1744), *E. H. Wilson*, August, 1911; Arboretum Roemershof near Riga, Livonia, *M. von Sivers*, 1913; Arboretum Pruhonitz near Prague, Czechoslovakia, under no. 1084 (from seed coll. by *E. H. Wilson*), *C. Schneider*, 1913.

This form differs from typical *L. trichosantha* Bur. & Franch. (*L. ovalis* Batal.) chiefly in its glabrous usually rather larger and very obtuse leaves and in its flower-buds being glabrous toward the apex, while in the type the leaves are pubescent beneath at least on the midrib and veins and the flower-buds pubescent all over.

***Lonicera trichosantha* f. *acutiuscula*, forma nov.**

A typo recedit foliis acutis vel acutiusculis plerisque ellipticis vel anguste ellipticis vel oblongo-ovatis subtus tantum ad costam et venis sparse pilosis vel fere glabris saepius minoribus, et ramis saepe magis elongatis vel fere sarmentosis.

CHINA. Shensi: Tai pei shan, *W. Purdom*, no. 933, 1910. Western Szechuan: Tachien-lu, *E. H. Wilson* (seed only).—Cultivated: Arnold Arboretum under no. 6671 (from seed collected by *E. H. Wilson* under no. 856b) August 26, 1914, August 22, 1916, August 28, 1917 (type); Arnold Arboretum under no. 19358 (from seed collected by *W. Purdom* under no. 731), June 5 and August 2, 1916, May 20, 1918; Fruticetum Vilmorin at Les Barres, France, under "semis 4154," *M. L. de Vilmorin*, May 30, 1909.

This variety differs from the type chiefly in its acute or acutish leaves usually smaller and only slightly pubescent or nearly glabrous beneath; it also differs in its usually more diffuse habit with the branches more elongated and flexuose or nearly sarmentose or sometimes partly prostrate. In its extreme form it approaches *L. prostrata* Rehd., but that species is distinctly prostrate, the leaves are still smaller and the flowers borne on longer peduncles and smaller.

***Lonicera deflexicalyx* var. *xerocalyx*, var. nov.**

Lonicera xerocalyx Diels in Notes Bot. Gard. Edinb. v. 177 (1912).

A typo recedit praecipue foliis anguste lanceolatis ad 10 cm. longis, cupula bracteolarum ovarium plerumque aequans vel paullo superans, calyce majore glabro.

CHINA. Yunnan: Lichiang Range, alt. 3500 m., *G. Forrest*, no. 2386 (type), June, 1906; Lichiang Range, alt. 4000 m. and 3600 m., *C. Schneider* nos. 1801, 2460, July 16 and September 8, 1914.

Lonicera xerocalyx differs from typical *L. deflexicalyx* Batal. only in the longer narrow-lanceolate leaves, the usually larger cupula and larger glabrous calyx, but in *Schneider*'s no. 1801 the cupula is not as high as the ovary and in *Purdom*'s nos. 1089 and 1090 of *L. deflexicalyx* the calyx is fully as large as that of *L. xerocalyx* and glabrous. I therefore cannot consider *L. xerocalyx* specifically distinct and refer it as a variety to *L. deflexicalyx*.

***Lonicera japonica* var. *repens*, comb. nov.**

Lonicera nigra Thunberg, Fl. Jap. 89 (1784).—Not Linnaeus.

Lonicera flexuosa Thunberg in Trans. Linn. Soc. II. 330 (1794).

Xylosteum flexuosum Dumont de Courset, Bot. Cult. ed. 2, VIII. 208 (1814).

Lonicera brachypoda De Candolle, Prodr. iv. 333 (1830).

Caprifolium flexuosum hort. apud Steudel, Nom. Bot. ii. 278 (1841).

Lonicera brachypoda var. *β. repens* Hort. Bogor. apud Siebold in Jaarb. Nederl. Maatsch. Anmoed. Tuinb. 1845, 73, t. 7.

Lonicera confusa Miquel in Ann. Mus. Bot. Lugd.-Bat. ii. 270 (1866); Prol. Fl. Jap. 153 (1866).—Not De Candolle.

Lonicera diversifolia Carrière in Rev. Hort. 1866, 99.

Lonicera Japonica Chinensis Baker in Ref. Bot. iv. t. 224 (1871), in part.—Not *L. chinensis* Wats.

Lonicera brachypoda repens Lavallé, Arb. Segrez. 140 (1877), name only.

Caprifolium japonicum subverticillare Kuntze, Gen. Pl. i. 273 (1891).

Lonicera japonica var. *flexuosa* Nicholson, Hand-list Arb. Kew. ii. 17 (1896).—Rehder in Ann. Rep. Missouri Bot. Gard. xiv, 161 (Syn. *Lonicera*) (1903).

As "repens" is the oldest varietal name of this Honeysuckle, the new combination proposed here becomes necessary.

× *Lonicera Sargentii* (*L. hirsuta* × *prolifera*), nom. nov.

Lonicera hirsuta × *Sullivantii* Sargent in Gard. & For. ix. 344, f. 46 (1896).—Rehder in Ann. Rep. Missouri Bot. Gard. xiv. 211 (Syn. *Lonicera*) (1903).

As this hybrid is still in cultivation and was well figured and described, a binomial may be given to it for convenient reference. It is clearly intermediate between the parents cited above; from *L. hirsuta* Eat. it differs in the less pubescent scarcely or not ciliate leaves, glandless inflorescence, slightly or scarcely pubescent corolla and from *L. prolifera* Rehd. (*L. Sullivantii* Gray) it can be distinguished by the more densely pubescent under side of the leaves and the slightly pilose and darker colored corolla.

THE TAXADS AND CONIFERS OF YUNNAN.

ERNEST H. WILSON

DURING the years 1922–23, Mr. J. F. Rock collecting in Yunnan under the auspices of the National Geographic Society, Washington, D. C., made a large collection of the Taxads and Conifers he met with. A set of these was presented to the herbarium of the Arnold Arboretum. Naming this collection has afforded an opportunity to identify other material in this herbarium collected in Yunnan and enables me to present a review of the TAXACEAE and PINACEAE of the whole province.

Yunnan is interesting as representing the southern limits of distribution of many species of these two families.

TAXACEAE is represented by four genera—*Taxus*, *Podocarpus*, *Torreya* and *Cephalotaxus*—with eight species of which three belong each to *Cephalotaxus* and *Podocarpus*. One species of *Cephalotaxus* (*Cephalotaxus Mannii* Hook. f.) was first found in Manipur, northern Assam, the other two are widespread in China. One *Podocarpus* is Indo-Malayan, the other two are doubtful plants of which I have seen no material. The *Torreya* is found from Hupeh westward whilst the *Taxus* is widespread in China and grows also in Formosa and the Philippines.

IN PINACEAE with fifteen genera Yunnan is richer than any other part of China. To these genera belong 33 species. Of these *Keteleeria Evelyniana* Mast. is doubtfully distinct; *Cryptomeria japonica* D. Don is cultivated only and *Thuja orientalis* L. may be an escape from cultivation and naturalized only. One other (*Fokienia Kawaii* Hayata) is described from the forests of the Tonkin-Yunnan border. *Abies Forrestii* Rogers is endemic and, strange to say, this is probably the only Conifer so far known confined to Yunnan. The most remarkable feature of all is the occurrence in extreme western Yunnan and in Formosa of *Taiwania cryptomerioides* Hayata, *Libocedrus macrolepis* Benth. & Hook. and *Pseudotsuga Wilsoniana* Hayata which are not known to grow elsewhere.

The subfamily ABIETEAEE is represented by seven genera in eighteen species of which one (*Keteleeria Evelyniana* Mast.) is doubtful. Of the four species of *Pinus* two (*Pinus Armandi* Franch. and *P. tabulaeformis* Carr.) are widespread in China and the former grows also in Formosa and on the Japanese islands of Tanega-shima and Yaku-shima. Another (*P. yunnanensis* Franch.) ranges north into the warm valleys of western Szechuan. The fourth (*P. insularis* Endl.), a tropical Indo-Malayan species, finds its northern limits in Yunnan. The tropical *P. Merkusii* Jungh. grows in the bordering regions of upper Burmah and Siam and will probably be found in Yunnan. I have seen no Yunnan specimens of *P. Massoniana* Lamb., the common low-level Pine of China, but feel certain it must grow in that province. Of the two *Pseudotsugas*, *Pseudotsuga sinensis* Dode has its western limits of distribution in northeastern Yunnan, whilst *P. Wilsoniana* Hayata grows in Formosa and extreme northwest Yunnan. The Larch finds its southern limits in Yunnan as do the two *Tsugas*. The four species of *Picea* are also found in Szechuan and belong two to the section *Omorica* and two to that of *Casicta*. Curiously enough no *Eupicea* has yet been found in Yunnan. Two (*Abies Delavayi* Franch. and *A. Beissneriana* Rehd. & Wils.) of the three *Abies* are common in western Szechuan whilst the third (*A. Forrestii* Rogers) as before stated is endemic.

Of the three genera belonging to the subfamily TAXODIEAE, *Cunninghamia* is abundant and widespread in the warmer parts of China, *Taiwania* is confined to Formosa and extreme northwest Yunnan and *Cryptomeria* is cultivated there as elsewhere outside of Japan proper.

The subfamily CUPRESSEAE is represented by five genera in nine species. Of these *Thuja orientalis* L. may be indigenous or merely naturalized. *Libocedrus macrolepis* Benth. & Hook. grows also in Formosa, but not elsewhere. One *Cupressus* (*Cupressus Duclouxiana* Hickel) is confined to Yunnan and the warm valleys of western Szechuan, the other (*C. funebris* Endl. is widespread in China. Of the five species of *Juniperus* two (*Juniperus Wallichiana* Hook. f. and *J. recurva* Buch.-Ham.) are Himalayan and have their western limits in Yunnan. Another (*J. formosana* Hayata) is widespread in China and is found also in Formosa and so too is *J.*

squamata Buch.-Ham. which extends westward to the Sikkim Himalayas. The fifth (*J. chinensis* L.) though widespread throughout China and north-eastern Asia generally is doubtfully indigenous in Yunnan.

TAXACEAE

Cephalotaxus Sieb. & Zucc.

Cephalotaxus Fortunei Hooker in Bot. Mag. LXXVI. t. 4499 (1850).—Parlatore in De Candolle, Prodr. xvi. pt. II. 503 (1868).—Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 102 (Pl. David. I. 292) (1884);—in Jour. de Bot. XIII. 265 (1899).—Kanitz in Szechenyi, Keletazs. Utján. Tudom. Ered. II. 848 (Pl. Enum. 63) (1891); in Wiss. Ergeb. Reise Szechenyi, II. 738 (1898).—Beissner in Nuov. Giorn. Bot. Ital. n. ser. IV. 186 (1897); in Bull. Soc. Bot. Ital. 1901, 358.—Pritzel in Bot. Jahrb. XXIX. 213 (1900).—Masters in Jour. Linn. Soc. XXVI. 545 (1902); XXXVII. 413 (1906); in Jour. Bot. XLI. 269 (1903).—Pilger in Engler, Pflanzenr. IV.—5, 103 (Taxac.) (1903).—Diels in Wiss. Ergeb. Exped. Filchner China Tibet, x. 247 (1908).—Dunn & Tutchet in Kew Bull. Misc. Inform. add. ser. x. 256 (Fl. Kwangtung & Hongkong) (1912).—Patschke in Bot. Jahrb. XLVIII. 629 (1913).—Rehder & Wilson in Sargent. Pl. Wilson. II. 5 (1914).—Chun, Chinese Economic Trees, 45 (1922).—Rehder in Bailey, Cult. Evergreens, 183 (1923).—Dallimore & Jackson, Handb. Conif. 23, fig. 3 (1923).

Cephalotaxus filiformis Knight & Perry ex Gordon, Pinetum, 46 (1858), as a synonym.

Cephalotaxus drupacea K. Koch, Dendr. II. pt. II. 104 (1873).—Not Siebold & Zuccarini.

Cephalotaxus Griffithii Beissner in Bull. Soc. Bot. Ital. 1901, 358.—Masters in Jour. Bot. XLI. 269 (1903); in Jour. Linn. Soc. XXXVII. 414 (1906).—Not Hooker f.

Cephalotaxus Mannii Masters in Jour. Linn. Soc. XXVI. 545 (1902).—Not Hooker f.

YUNNAN: Between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8150, March, 1923; mountains south of Likiang, Sungkwe Hochin Range, *J. F. Rock*, no. 8298, in 1923; Litiping Range, Mekong-Yangtze divide, east of Weihsi, *J. F. Rock*, nos. 8691, 9397, 10370, 11572, 11575, in 1923; Siaomio-tsin near Pe-yen-tsin, *Siméon Ten*, no. 315, September, 1916; Hoa-Kiao-pin near Pe-yen-tsin, *Siméon Ten*, no. 161, June, 1916; Kou-ty near Pe-yen-tsin, *Siméon Ten*, no. 460, in 1917; Mengtze, mountains to the north, alt. 2300 m., *A. Henry*, no. 9100.

SZECHUAN: Yen-yuan Hsien, alt. 2900 m., *C. Schneider*, no. 3573, May, 1914; between Kalapa and Liuku, alt. 3000-3300 m., *C. Schneider*, no. 1290, May, 1914.

DISTRIBUTION: China, south of the Yellow River at moderate altitudes, from the east coast to the extreme west.

Cephalotaxus Mannii Hooker f. in Hooker's Icon. Pl. xvi. t. 1523 (1886); Fl. Brit. Ind. v. 647 (1888).

YUNNAN: without locality, *G. Forrest*, no. 7798.

DISTRIBUTION: Assam, Khasia mountains eastward to the mountains of southwestern Yunnan.

Forrest's specimen consists of leafy shoots which have subfalcate leaves and agree well with co-type specimens of Hooker's species in this herbarium.

Cephalotaxus drupacea Siebold & Zuccarini in Abh. Akad. Münch. iv. pt. III. 232 (Fl. Jap. Fam. Nat. II. 108) (1846).—Hemsley in Bot. Mag. cxxxv. t. 8235 (1909).—Rehder & Wilson in Sargent, Pl. Wilson. II. 3 (1914), where full synonymy and references are given.

DISTRIBUTION: Japan, south Korea and east China as far west as the province of Hupeh.

I have seen no specimens of typical *C. drupacea* S. & Z. from the province of Yunnan.

Cephalotaxus drupacea var. *sinensis* Rehder & Wilson in Sargent, Pl. Wilson. II. 3 (1914).—Rehder in Jour. Arnold Arb. iv. 118 (1923) where full synonymy and references are given.

YUNNAN: without locality, *G. Forrest*, no. 11683.

DISTRIBUTION: mountains of central and western China from the province of Honan westward.

Forrest's specimen bears young unopened male flowers and is rather fragmentary. This is the only material I have seen of this variety from the province of Yunnan.

Torreya Arn.

Torreya Fargesii Franchet in Jour. de Bot. XIII. 264 (1899).—Pritzel in Bot. Jahrb. XXIX. 214 (1900).—Pilger in Engler, Pflanzenr. IV.-5, 108 (Taxac. (1903).—Pampanini in Nuov. Giorn. Bot. Ital. n. ser. XVII. 231 (1910).—Patschke in Bot. Jahrb. XLVIII. 630 (1913).

Torreya grandis Rehder & Wilson in Sargent. Pl. Wilson. II. 7 (1914). Not Fortune.

Tumion fargesii Skeels in Proc. Biol. Soc. Wash. XXXVIII. 88 (1925).

YUNNAN: Between Tengyueh and Likiangfu, via Shweshanting, Kandingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8144, March, 1923; Litiping Range, Mekong-Yangtsze divide east of Weihsi, *J. F. Rock*, nos. 8692, 9396, 10374, in 1923; same locality, Lienfu, alt. 2400 m., *H. Handel-Mazzetti*, no. 7848, August, 1915; valley of the Salween River, alt. 2500-2700 m., *H. Handel-Mazzetti*, no. 8302, September, 1915.

DISTRIBUTION: western China, mountains of Hupeh, Szechuan and Yunnan.

This species is characterized by its gray, yellowish green bark on shoots

two years old and upwards and by its deeply ruminant endosperm. The east China *T. grandis* Fortune has similar bark but the endosperm is scarcely if at all ruminant. When working up the TAXACEAE for Sargent's *Plantae Wilsonianae*, my colleague, A. Rehder, and I had seen no ripe fruits of Fortune's species and, moreover, overlooked the illustration in *Gardeners' Chronicle*, 1858, 588, fig. and confused the two species. With ripe fruits available the differences are perfectly obvious.

Taxus L.

Taxus chinensis Rehder in Jour. Arnold Arb. i. 51 (1919); iv. 119 (1923); in Bailey, *Cult. Evergreens*, 187 (1923).—Dallimore & Jackson, *Handb. Conif.* 71 (1923).—Silva Tarouca & Schneider, *Uns. Freiland-Nadelholz.* 34, fig. (1923).

Taxus baccata Franchet in *Nouv. Arch. Mus. Paris*, sér. 2, vii. 103 (Pl. David. i. 293) (1884).—Pritzel in *Bot. Jahrb.* xxix. 214 (1900).—Masters in Jour. Linn. Soc. xxvi. 546 (1902); in Jour. Bot. xli. 269 (1903); in Jour. Linn. Soc. xxxvii. 414 (1906).—Not Linnaeus.

Taxus baccata, subsp. 2. *cuspidata* var. b. *chinensis* Pilger in Engler, *Pflanzenr.* iv.-5, 112 (Taxac.) (1903).—Patschke in *Bot. Jahrb.* xlviii. 630 (1913).—Henry in Elwes & Henry, *Trees Gr. Brit. & Irel.* i. 108 (1906).

Taxus cuspidata var. *chinensis* Rehder & Wilson in Sargent, *Pl. Wilson.* ii. 8 (1914).

Taxus baccata, subsp. 1. *Wallichiana* var. b. *chinensis* Pilger in *Bot. Jahrb.* liv. 43 (1916).

Taxus cuspidata Chun, *Chin. Econ. Trees*, 43, fig. 13 (1922).—Not Siebold & Zuccarini.

YUNNAN: Shweli River drainage basin to summit of Shweli-Salween watershed east of Tengyueh, *J. F. Rock*, no. 7587, November, 1922; Litiping Range, Mekong-Yangtze divide, east of Weihsi, *J. F. Rock*, no. 11573, in 1923; near Talifu, alt. 3200 m., *H. Handel-Mazzetti*, no. 6408, May, 1915; between Sungyueh and Tengchuan, alt. 3000-3200 m., *C. Schneider*, no. 2918, Sept., 1914; without locality, *G. Forrest*, nos. 9642, 11789 and 12087.

DISTRIBUTION: China, widely spread; also on the mountains of Formosa, Luzon in the Philippine Islands and those of Manipur.

The western limits of the range of this species are not known but very possibly they will prove to be on the Sikkim Himalayas. Dr. Handel-Mazzetti's specimen has been named by him *T. Wallichiana* Zucc., but that species would appear to be confined to the northwestern Himalayas. The several specimens I have seen from Luzon in the Philippines and from Manipur in northern Assam are identical in every way with material from Hupeh and Szechuan. The Chinese Yew with its longer leaves of a cheery green color and very numerous slender branchlets is under cultivation very distinct from either the Japanese or European species.

Podocarpus L'Herit.

Podocarpus neriifolius D. Don in Lambert, *Descr. Pinus*, ii. 21 (1824), in part; ed. minor, 142 (1832).—Hooker in *Bot. Mag.* xxxviii. t. 4655 (1852).—Masters in Jour. Linn. Soc. xxvi. 548 (1902); lxxvii. 414 (1906).

—Pilger in Engler, Pflanzenr. iv.-5, 80 (Taxaceae) (1903).—Patschke in Bot. Jahrb. XLVIII. 629 (1913).—Rehder & Wilson in Sargent Pl. Wilson. II. 9 (1914).—Hayata in Tokyo Bot. Mag. XXXI. 119 (1917).

Podocarpus macrophylla Wallich, Tent. Fl. Nepal, 56, t. 43 (1824), excluding synonyms; Cat. No. 6052a (1830).—Franchet in Jour. de Bot. XIII. 265 (1899).—Pritzel in Bot. Jahrb. XXIX. 213 (1900).—Masters in Jour. Linn. Soc. XXVI. 548 (1902).—Patschke in Bot. Jahrb. XLVIII. 629 (1913), in part.—Pilger in Bot. Jahrb. LIV. 38 (1916).—Not D. Don.

Podocarpus macrophylla var. *acuminatissima* Pritzel in Bot. Jahrb. XXIX. 213 (1900).

YUNNAN: Szemao, Yulo forest, alt. 1300 m., *A. Henry*, no. 12919.

DISTRIBUTION: India and Burmah eastward through Malaya.

Henry's specimen, which is the only one we have seen from Yunnan, consists of a leafy shoot only. It may not belong to this species, although it agrees well with a specimen so-named collected in Perak by L. Wray, Jr. (No. 2922), and received from Herb. Singapore. Hayata records it as collected by Professor Kawai on the Tonkin border. My own knowledge of this tree in China is based on specimens cultivated in the grounds of several temples on and around Mt. Omei in western Szechuan.

Podocarpus Forrestii Craib & W. W. Smith in Notes Bot. Gard. Edinburgh, XII. 219 (1920).—Dallimore & Jackson, Handb. Conif. 46 (1923.)

Podocarpus macrophyllus Diels in Notes Bot. Gard. Edinburgh, VII. 258 (Pl. Chin. Forrest.) (1912).—Not D. Don.

DISTRIBUTION: Yunnan, the Tali Range.

I have seen no material of this species.

Podocarpus Mairei Lemée & Léveillé in Le Monde des Pl. 1914, 20.

DISTRIBUTION: Yunnan.

This is an obscure plant which is unknown to me except by the author's brief description and which may not belong to the genus. Possibly it is referable to *Keteleeria Davidiana* Beissn.

PINACEAE

Subfam. ABIETEAEE Spach

Pinus L.

Pinus tabulaeformis Carrière, Traité Conif. ed. 2, 510 (1867).

YUNNAN: Yunnanfu district, *C. Schneider*, nos. 116, 119, 141 February, 1914.

DISTRIBUTION: China, wide-spread, being found at sea-level in the colder parts and on mountains above 1000 m. throughout the warmer provinces; also in southern Mongolia and in Manchuria as far east as the watershed of the Yalu River.

The above are the only specimens of the common mountain Hard Pine of China which I have seen from Yunnan province; however, in all probability it is quite common on the mountains of the more northern parts.

My colleague, A. Rehder, discusses the name of this Pine and its priority on page 22 of this number of the Journal of the Arnold Arboretum.

Pinus yunnanensis Franchet in Jour. de Bot. XIII. 253 (1899).—Masters in Jour. Linn. Soc. XXVI. 553 (1902); XXXVII. 415 (1906).—Shaw in Sargent, Pl. Wilson. I. 2 (1911).—Patschke in Bot. Jahrb. XLVIII. 657 (1912).

Pinus sinensis var. *yunnanensis* Shaw in Sargent, Pl. Wilson. II. 17 (1914); Genus *Pinus*, 60, t. 23, fig. 202-203 (1914).—Rehder in Bailey, Cult. Evergreens, 320 (1923).—Dallimore & Jackson, Handb. Conif. 451 (1923).

YUNNAN: between Kambalti and Tengyueh, via Kuyung, *J. F. Rock*, no. 7545, November, 1922; between Tengyueh and Lungling, *J. F. Rock*, no. 7098, Oct.-November, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8037, March, 1923; eastern slopes of Likiang Snow Range, Yangtze watershed, *J. F. Rock*, no. 11699, (1923-24); north of Yunnanfu, *C. Schneider*, no. 276, March, 1914.

SZECHUAN: between Tungan-chou and Chang-kuan-chung, *C. Schneider*, no. 530, March, 1914; between Hui-li-chuo and Pai-kuo-wan, *C. Schneider*, no. 689, March, 1914; between Techang and Hang-lien-po, *C. Schneider*, no. 806, April, 1914.

DISTRIBUTION: western Yunnan northward to Washan in western Szechuan.

Shaw regards this Pine as a variety of the widely distributed *P. sinensis* Lambert, now known as *Pinus tabulaeformis* Carr., but with its red peeling bark, its very long (20-30 cm.) slender leaves most usually in fascicles of three, and its cocoa-brown cone with but slightly developed apophysis, it is really very distinct. I never had any difficulty in distinguishing it in the field. It is a low-level Pine in the river valleys of southwest Szechuan and west of the limits of the Red Basin. It extends southward into western Yunnan. It is a tree of medium size usually with long, drooping, slender leaves in fascicles of three on all the main shoots and relatively large, long-persistent cones. On the upper part of the trunk and main branches the bark is usually red and exfoliates in thin sheets. On the lower part of the trunk the bark is persistent and deeply fissured into irregular, oblong masses. The branches are rather short and the habit usually pyramidal, though old trees are frequently flat-headed. The wood is moderately close-grained and is used for fuel and also for general construction purposes.

Pinus insularis Endlicher, Syn. Conif. 157 (1847).—Clinton-Baker, Ill. Conif. III. 37, t. (1913).—Shaw, Genus *Pinus*, 60, t. 23, figs. 208-210 (1914).

Pinus Kesiya Royle apud Loudon, Gard. Mag. n. s. VI. 8 (1840), nomen nudum.

Pinus taeda Blanco, Fl. Filip. 767 (1837).—Not Linnaeus.

Pinus khasiana Griffith, Notul. Pl. Asiat. IV. 18 (1854); Icon. Pl. Asiat. t. 367-368 (1854).

Pinus Kasya Royle apud Parlatore in De Candolle, Prodr. xvi. pt. 2, 390 (1868).—Brandis, Forest Fl. Brit. Ind. 508 (1874).—Kurz, For. Fl. Brit. Burmah II. 499 (1877).—Gamble, Man. Ind. Timbers, 397 (1881).—Hooker f., Fl. Brit. Ind. vi. 652 (1888).

Pinus Khasya Brandis, Ind. Trees, 690 (1906).—Clinton-Baker Ill. Conif. III. 38, t. (1913).—Dallimore & Jackson, Handb. Conif. 400 (1923).

YUNNAN: between Kingtung Chai and Muang Hing, alt. 1500 m., *J. F. Rock*, no. 2694, March, 1922; watershed of the Black River between Man Lien and Hsinfu, *J. F. Rock*, no. 2941, March, 1922; between Chehu and Noan-Ma-Kai, *J. F. Rock*, no. 2965, March, 1922; valley of the Salween River, alt. 2200–2000 m., *H. Handel-Mazzetti*, no. 8401, Sept., 1915.

UPPER BURMAH, KENG TUNG TERRITORY: between Pang-Sop-Lao and Ban-Yang-Kha, alt. 1000 m., *J. F. Rock*, no. 2147, January, 1922; Ban Saa, alt. 1000 m., *J. F. Rock*, no. 2261, Jan.-Feb., 1922; on ridges above Ta Ping, between Meh Lui river and Muang Mah, alt. 800–1200 m., *J. F. Rock*, no. 2297, Feb., 1922.

DISTRIBUTION: Philippines, Upper Burmah, Assam and southwestern Yunnan.

Rock remarks that this Pine is the most common tree in extreme southwestern Yunnan and that around Szemao the hillsides are covered with it to the exclusion of nearly every other tree. Dr. Handel-Mazzetti's specimen is from about the northern limits of the range of the species.

Pinus Merkusii Junghuhn & De Vriese in De Vriese, Pl. Nov. Ind. Bat. Or. 5, t. 2 (1845).—Endlicher, Syn. Conif. 176 (1847).—Miquel, Fl. Nederl. Ind. II. 1069 (Fl. Ind. Bat.) (1856).—De Boer, Conif. Archip. Ind. 5 (1866).—Parlatore in De Candolle, Prodr. xvi. pt. II. 389 (1868).—Kurz, For. Fl. Brit. Burmah, II. 499 (1877).—Gamble, Man. Ind. Timbers, 398 (1881).—Hook. f., Fl. Brit. Ind. v. 652 (1888).—Brandis, Ind. Trees, 691 (1906).—Clinton-Baker, Ill. Conif. III, 41, t. (1913).—Shaw, Genus *Pinus*, 58, t. 23, figs. 198–200 (1914).—Dallimore & Jackson, Handb. Conif. 415 (1923).

Pinus sylvestris Loureiro, Fl. Cochinch. II. 579 (1790).—Not Linnaeus.

Pinus sumatrana Junghuhn in Bot. Zeit. 1846, 699.

Pinus Finlaysoniana Wallich apud Blume, Rumphia, III. 210 (1847).

Pinus Latteri Mason in Jour. Asiat. Soc. I. 74 (1849).—Kurz in Flora, 1872, 264.

UPPER BURMAH, KENG TUNG TERRITORY: between Pang Sop Lao and Ban Yang Kha, valley of the Meh Len, alt. 800–1100 m., *J. F. Rock*, no. 2155, Jan., 1922.

SIAM, CHIENGMAI PROV.: between Meh Soi and Hue San, alt. 480–525 m., *J. F. Rock*, no. 1836, January, 1922.

This species has not yet been reported wild in China proper, but since it grows in the Upper Shan States adjacent to southwestern Yunnan it will probably be found in that province. In this herbarium there is a specimen of this Pine collected in Hainan by F. A. McClure (No. 9805) from a planted tree.

Pinus Massoniana Lambert, Descr. Pinus, i. 17, t. 12 (1803); ed. 2, i. 16, t. 8 (1828); ed. minor, 20, t. 8 (1832).—Shaw in Sargent, Pl. Wilson. i. 1, (1922); ii. 14 (1914), where full references and an account of this species will be found.

DISTRIBUTION: China, widely spread throughout the warmer parts from sea-level up to 1800 m.; also in Formosa but doubtfully indigenous there.

There is no material from Yunnan of this species in this herbarium neither have I actual knowledge of its growing there, but there is little doubt that it does.

Pinus Armandi Franchet in Nouv. Arch. Mus. Paris, sér. 2, vii. 95, t. 12 (Pl. David. i. 285) (1884); in Jour. de Bot. xiii. 254 (1899).—Beissner in Nuov. Giorn. Bot. Ital. n. ser. iv. 184 (1897).—Masters in Jour. Linn. Soc. xxvi. 549 (1902); xxxvii. 415 (1906).—Clinton-Baker, Ill. Conif. i. 6, t. (1909).—Elwes & Henry, Trees Gr. Brit. & Irel. v. 1043 (1909).—Stapf in Bot. Mag. cxxxvi. t. 8347 (1910).—Mottet in Rev. Hort. 1910, 423, fig. 177-179.—Shaw in Sargent, Pl. Wilson. i. 1 (1911); ii. 12 (1914); Gen. Pinus, 30, t. 9, fig. 96-99 (1914).—Bean, Trees, Shrubs Brit. Isles, ii. 172, fig. (1914).—Wilson, Conif. Tax. Jap. 20 (1916).—Chun, Chin. Econ. Trees, 11, t. 5 (1922).—Rehder in Bailey, Cult. Evergreens, 305 (1923); in Jour. Arnold Arb. iv. 119 (1923).—Dallimore & Jackson, Handb. Conif. 370 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz, ed. 2, 72, fig. 74, t. 2, fig. o (1923).

Pinus quinquefolia David, Jour. Trois. Voy. Chin. i. 192 (1875), name only.

Pinus koraiensis Beissner in Nuov. Giorn. Bot. Ital. n. ser. iv. 184 (1897).—

Masters in Jour. Linn. Soc. xxvi. 550 (1902); xxxvii. 415 (1906); in Gard.

Chron. ser. 3, xxxiii. 34, fig. 18, 19 (1903).—Not Siebold & Zuccarini.

Pinus scipioniformis Masters in Bull. Herb. Boiss. vi. 270 (1898).

Pinus mandshurica Masters in Jour. Linn. Soc. xxvi. 551 (1902).—Not Ruprecht, nor Murray.

Pinus Mastersiana Hayata in Gard. Chron. ser. 3, xliii. 194 (1908).

Pinus Armandi var. *Mastersiana* Hayata in Jour. Coll. Sci. Tokyo, xxv. art. 19, 215, fig. 8 (Fl. Mont. Formos.) (1908).

Pinus levis Lemée & Lévillé in Fedde, Rep. Spec. Nov. viii. 60 (1910).

Pinus excelsa var. *chinensis* Patschke in Bot. Jahrb. xlviii. 657 (1912).

YUNNAN: Watershed of the Black River or Papienho, between Mohei and Maokai and beyond Chugai, alt. 2100-2300 m., *J. F. Rock*, nos. 2994, 3019, April, 1922; headwaters of the Red River between Mao-goi and Nan-chien, alt. 2000 m., *J. F. Rock*, no. 3025, April, 1922; drainage basin of Erhhai (Lake of Talifu), Tsangshan Range, alt. 2300-2600 m., *J. F. Rock*, no. 3170, April, 1922; Yangtze watershed, Likiang plateau, *J. F. Rock*, nos. 3614, 5877, May, 1922; west of Talifu, Mekong watershed, between Youngchang and Tengyueh *J. F. Rock*, no. 6792, Sept.-Oct., 1922; Yunnanfu, *C. Schneider*, nos. 117, 142, February, 1914; Mengtsze, alt. 2300 m., *A. Henry*, no. 10519; district of Mi-le, *A. Henry*, no. 9868; without locality, *E. E. Maire*; without locality, *G. Forrest*, no. 11919.

DISTRIBUTION: China, mountains south of the Yellow River in central,

western and southwestern China; also in Formosa and on the Japanese Islands of Tanega-shima and Yaku-shima.

This is the only 5-needle Pine native of China. In Yunnan it is fairly common. Rock says that around Tali Lake it grows in association with *Pinus yunnanensis* Franch. In 1899 I gathered ripe seeds at 2300 m. altitude near Lu-tung-po where the tree was growing associated with *Magnolia Delavayi* Franch.

Larix Mill.

Larix Potaninii Batalin in Act. Hort. Petrop. XIII. 385 (1893).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906); in Gard. Chron. ser. 3, XXXIX. 178, fig. 68 (1906).—Bean in Kew Bull. Misc. Inform. XXIII. 173, t. (1910).—Patschke in Bot. Jahrb. XLVIII. 651 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 18 (1914).—Chun, Chin. Econ. Trees, 6, fig. 3 (1922).—Rehder in Jour. Arnold Arb. IV. 121 (1923); in Bailey, Cult. Evergreens, 290 (1923).—Dallimore & Jackson, Handb. Conif. 297 (1923).

Larix chinensis Beissner in Mitt. Deutsch. Dendr. Ges. v. 68 (1896); in Nuov. Giorn. Bot. Ital. n. ser. IV. 183, t. 5, fig. 1 (1897).—Pritzel in Bot. Jahrb. XXIX. 216 (1900).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906).—Patschke in Bot. Jahrb. XLVIII. 651 (1913).

Larix thibetica Franchet in Jour. de Bot. XIII. 262 (1899).—Pritzel in Bot. Jahrb. XXIX. 216 (1900).—Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906).

Larix Griffithii Masters in Jour. Linn. Soc. XXVI. 558 (1902); XXXVII. 424 (1906).—Not Hooker f. & Thomson.

Pinus sinensis Voss in Putlitz & Meyer, Landlexicon, IV. 769 (1913).—Non Lambert.

YUNNAN: Yangtze watershed, prefectural district of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, nos. 3404, 3839, May & October, 1922; same locality, nos. 8193, 11661, in 1923–24; without locality *G. Forrest*, no. 10185.

DISTRIBUTION: mountains of northwestern Yunnan and northward on those of western Szechuan and southern Kansu and eastward to the mountains of Shensi.

The cones of Rock's no. 3404 are from 6 to 7.5 cm. long and are much larger than I have heretofore seen. At first glance the specimen suggests *L. Griffithiana* Hook. f. & Thoms. but it has the polished glabrous shoot, leaves keeled on both surfaces and erect bracts to the cone-scales characteristic of *L. Potaninii* Batal.

Picea A. Dietr.

Sect. CASICTA Mayr.

Picea likiangensis Pritzel in Bot. Jahrb. XXIX. 217 (1900).—Masters in Jour. Linn. Soc. XXVI. 554 (1902); XXXVII. 418 (1906).—Beissner, Handb. Nadelholz. ed. 2, 249 (1909).—Patschke in Bot. Jahrb. XLVIII. 632, fig. 1, 6 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 31 (1914).—Chun,

Chin. Econ. Trees, 19 (1922).—Rehder in Bailey, Cult. Evergreens, 285 (1923).—Dallimore & Jackson, Handb. Conif. 334, fig. 73 (1923), excluding synonyms.

Abies likiangensis Franchet in Jour. de Bot. XIII. 257 (1899).

Picea Alcockiana Masters in Jour. Linn. Soc. XXXVII. 418 (1906).—Not Carrière.

YUNNAN: High plateau between Talifu and Likiang to the foot of the Likiang Snow Range, *J. F. Rock*, no. 3271, May, 1922; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 3542, May–October, 1922; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 10888, in 1923–24; Likiang Snow Range, alt. 2500 m., *J. M. Delavay*, no. 1031, July, 1884; Yungning, *C. Schneider*, no. 1612, June, 1914; without locality, *G. Forrest*, nos. 10151, 10295.

SZETCHUAN: Between Kalapa and Liuku, alt. 3900 m., *C. Schneider*, no. 1291, May, 1914; Molien, alt. 3000–3600 m., *C. Schneider*, no. 1428, May, 1914; between Oti and Ouentin, alt. 2800 m., *C. Schneider*, no. 1452, June, 1914; between Choso and Woloho, alt. 3000 m., *C. Schneider*, no. 1573, June, 1914.

DISTRIBUTION: Mountains of northwestern Yunnan northward to the neighborhood of Tachien-lu in western Szechuan.

Schneider's specimens are mostly without cones and some may belong to the related *P. montigena* Mast. The Likiang Spruce is evidently a very common tree in the alpine regions of northwestern Yunnan, as it is round Tachien-lu and elsewhere in southwestern Szechuan. It is cultivated in England from seeds that I sent from Tachien-lu in 1904 to Messrs. Veitch (Seed nos. 1836, 1834). There is growing in this Arboretum plants of a Spruce received in 1924 from Messrs. Hillier & Sons of Winchester, England, under the name of "*P. yunnanensis*" which are evidently *P. likiangensis* Pritzl.

Messrs. Dallimore & Jackson (l.c.) would include under this species the *P. likiangensis* var. *rubescens* Rehd. & Wils., *P. Balfouriana* Rehd. & Wils. and would relegate *P. purpurea* Mast. to varietal rank. In the present state of our knowledge such wholesale lumping is likely to make confusion worse confounding.

Picea montigena Masters in Gard. Chron. ser. 3, XXXIX. 146, fig. 56 (1906), excluding cone.—Patschke in Bot. Jahrb. XLVIII. 632 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 33 (1914).—Chun, Chin. Econ. Trees, 18 (1922).—Rehder in Bailey, Cult. Evergreens, 284 (1923).

YUNNAN: Yangtsze watershed, Prefectural district of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, nos. 3403, 4761, 5328, May–October, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao–Yunlung, Lanping, Chienchuan and Likiang, *J. F. Rock*, no. 8158, March, 1923; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 10890, in 1923–24.

SZECHUAN: between Yenyuan Hsien and Hunka, alt. 2900 m., *C. Schneider*, no. 1486, June, 1914.

DISTRIBUTION: Mountains of northwestern Yunnan northward to those round Tachien-lu in western Szechuan.

Messrs. Dallimore & Jackson (Handb. Conif., 316 [1923]) reduce this species to *P. asperata* Mast., but the latter is an *EUPICEA* while *P. montigena* Mast. belongs to the section *CASICTA*.

Sect. OMORICA Mayr.

Picea complanata Masters in Gard. Chron. ser. 3, xxxix. 146, fig. 57 (1906).—Beissner, Handb. Nadelholzk. ed. 2, 288 (1909).—Bean in Kew Bull. Misc. Inform. 1910, 174.—Patschke in Bot. Jahrb. XLVIII. 632 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 35 (1914).—Rehder in Bailey, Cult. Evergreens, 286 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. ed. 2, 33, fig. (1923).

Abies brachytyla Franchet in Jour. de Bot. XIII. 258 (1899), as to Delavay's specimen, not *Picea brachytyla* Pritzel.

YUNNAN: Between Tengyueh and Likiangfu, via Shweshanting, Kanningai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8142, March, 1923; Karila and Ponzela, Yangtsze watershed, southeast of Peimashan, *J. F. Rock*, no. 11705, in 1923; watershed of Salween and Irrawadi rivers, Tjiontson-lumba valley, alt. 2950-3050 m., *H. Handel-Mazzetti*, no. 9209, July, 1916; "Ona-pen-Késu sur le Ma-eulchan, 2500 m.," *J. M. Delavay*, no. 4129, August, 1889.

DISTRIBUTION: Mountains of western Yunnan, northward to those of Wen-ch'uan Hsien in western Szechuan.

An old detached cone, evidently picked from the ground, is associated in this herbarium with Rock's no. 11705. I do not think it belongs there or to the species, but to *Picea likiangensis* Pritzel. Dr. Stapf in Bot. Mag. CXLVIII. sub t. 8969 (1922) unites all the Chinese Spruces of the OMORICA group under *Picea brachytyla* Pritzel; Dallimore & Jackson do the same. I am unable to agree to this drastic lumping together. As I know them in a wild condition these trees present many differences which are, I think, entitled to recognition. As our knowledge increases and the plants become properly known under cultivation it will be possible to critically revise the classification of the species of *Picea* native of China, but that time is not yet. Whatever disposition is made of the three Omorica Spruces (*P. complanata* Mast., *P. ascendens* Patsche, *P. Sargentiana* Rehder & Wils.) of Yunnan and western Szechuan I am convinced that that of western Hupeh and eastern Szechuan (*P. brachytyla* Pritzel) will be recognized as a good and perfectly distinct species.

Picea ascendens Patschke in Bot. Jahrb. XLVIII. 632 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 34 (1914).—Rehder in Bailey, Cult. Evergreens, 286 (1923).

YUNNAN: western slope of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, nos. 4136, 10865, 10889, May-June, 1922 and April, 1923; Litiping Range, Mekong-Yangtsze divide, east of Weihsu, *J. F. Rock*, no. 11574, in 1923; Salween valley, border of Tsarong, Tibet, *J. F. Rock*, no. 11498, in 1923.

DISTRIBUTION: Mountains of northwestern Yunnan and northward to the district of Lungan-fu in northwestern Szechuan.

No. 11498 consists of a sterile branch and may belong to another species.

Tsuga Carr.

Tsuga yunnanensis Masters in Jour. Linn. Soc. xxvi. 556 (1902).—Beissner, Handb. Nadelholzk. ed. 2, 83 (1909).—Patschke in Bot. Jahrb. XLVIII. 639 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. II. 63 (1914).—Hayata in Tokyo Bot. Mag. xxxi. 118 (1917).—Chun, Chin. Econ. Trees, 22 (1922).—Rehder in Bailey, Cult. Evergreens, 266 (1923).—Dallimore & Jackson, Handb. Conif. 538, fig. 119 (1923).—Downie in Notes Bot. Gard. Edinburgh, xiv. 16, fig. 194, 1 (1923).

Abies dumosa var. *chinensis* Franchet in Jour. de Bot. XIII. 258 (1899), as to Delavay's specimen.

Abies yunnanensis Franchet in Jour. de Bot. XIII. 258 (1899).—Bois in Jour. Soc. Hort. France, ser. 4, I. 231 (1900).

Tsuga dura Downie in Notes Bot. Gard. Edinburgh, xiv. 16, fig. 194, 2 (1923).

Tsuga leptophylla Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 25, p. 3 (Anzeig. Akad. Wiss. Wien. no. 10.) (1924).

YUNNAN: Shweli River drainage basin to summit of Shweli-Salween watershed east of Tengyueh, *J. F. Rock*, no. 7643, November, 1922; Mount Laichunshan, southwest of the Yangtsze bend of Shiku, *J. F. Rock*, no. 11493, in 1923; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8152, March, 1923; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, nos. 3540, 3724, May-October, 1922; same locality, *J. F. Rock*, no. 9049, in 1923-24; Yangtsze watershed, western slopes of Likiang Snow Range, *J. F. Rock*, no. 4608, May 30-June 6, 1922; eastern slopes of the Likiang Snow Range, alt. 3200 m., *C. Schneider*, no. 7979, July, 1914; between Chung-tien and Chitsung, alt. 3200-3575 m., *H. Handel-Mazzetti*, no. 7795, August, 1915 (co-type of *Tsuga leptophylla* Hand.-Mazz.); without locality, *G. Forrest*, no. 9056.

SZCHUAN: Ning-yuan-fu, Lo-tieh shan, alt. 2900-3500 m., *C. Schneider* nos. 914, 4001, April 15, 1914; Lololand, *C. Schneider*, no. 3974, April, 1914.

DISTRIBUTION: high mountains of western Yunnan northward to those of Wen-ch'uan Hsien in western Szechuan.

This species of Hemlock Fir is quite local in distribution as compared with *T. chinensis* Pritzl, being known only from the mountains of the extreme west. There, however, it is plentiful and grows to a large size. The species is well distinguished by its leaves which are entire and rounded

at the apex with a margin usually serrulate and by its sessile cone with dull flexible cone-scales which are inclined to curve outward at the summit.

Tsuga chinensis Pritzl in Bot. Jahrb. xxix. 217 (1900).—Masters in Jour. Linn. Soc. xxvi. 556 (1902); xxxvii. 421 (1906).—Beissner, Handb. Nadelholzk. ed. 2, 82 (1909).—Patschke in Bot. Jahrb. xlviii. 639 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 37 (1914).—Bean, Trees, Shrubs Brit. Isles, ii. 606 (1914).—Downie in Notes Bot. Gard. Edinburgh, xiv. 18, fig. 194, 5 (1923).—Chun, Chin. Econ. Trees, 22, fig. 7 (1922).—Rehder in Bailey, Cult. Evergreens, 266 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelholz. ed. 2, 36, fig. (1923).—Dallimore & Jackson, Handb. Conif. 533, fig. 117 (1923).

Abies thei-sha David, Jour. Trois. Voy. Chin. i. 343 (1875), name only.

Abies Tsuga Franchet in Nouv. Arch. Mus. Paris, ser. 2, vii. 97 (Pl. David. i. 287) (1884).—Not Siebold & Zuccarini.

Abies dumosa var. *chinensis* Franchet in Jour. de Bot. xiii. 258 (1899), excl. Delavay's specimen.

Abies chinensis Franchet in Jour. de Bot. xiii. 259 (1899).—Bois in Jour. Soc. Hort. France, ser. 4, i. 230 (1900).

Tsuga dumosa var. *chinensis* Pritzl in Bot. Jahrb. xxix. 217 (1900).

Tsuga Sieboldi Pritzl in Bot. Jahrb. xxix. 217 (1900).—Masters in Jour. Linn. Soc. xxvi. 556 (1902); xxxvii. 421 (1906); in Jour. Bot. xli. 270 (1903).—Not Carrière.

Tsuga yunnanensis Masters in Gard. Chron. ser. 3, xxxix. 236, fig. 93 (1906), in part; xxxvii. 421 (1906).—Bean in Kew Bull. Misc. Inform. 1910, 176.—Not Masters in Jour. Linn. Soc. xxvi. 556 (1902)

Tsuga Brunoniana Masters in Jour. Linn. Soc. xxxvii. 421 (1906).—Downie in Notes Bot. Gard. Edinburgh xiv. 19 (1923).—Not Carrière.

Tsuga diversifolia Masters in Jour. Linn. Soc. xxxvii. 422 (1906), as to Formosan plant.—Not Masters in Jour. Linn. Soc. xviii. 514 (1881).

Tsuga formosana Hayata in Gard. Chron. ser. 3, xliii. 194 (1908); Jour. Coll. Sci. Tokyo, xxv. art. 19, 222, fig. 12 (Fl. Mont. Formos.) (1908); in Fedde, Rep. Spec. Nov. viii. 366 (1910); Act. III. Congr. Internat. Bot. Bruxelles, 1910, ii. 76, pl. 28 (1912); Icon. Pl. Formos. v. 206 (1915).—Kanehira, Formos. Trees, 617 (1917).

Tsuga patens Downie in Notes Bot. Gard. Edinburgh, xiv. 16, fig. 194, 6 (1923).

Tsuga Wardii Downie, l. c. 17, fig. 194, 4.

Tsuga calcarea Downie, l. c. 17, fig. 194, 3.

Tsuga Forrestii Downie, l. c. 18, fig. 194, 7.

Tsuga intermedia Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 25, p. 2 (Anzeig. Akad. Wiss. Wien. no. 10) (1924).

YUNNAN: eastern slopes of Mount Dyinaloko, northern peak of the Likang Snow Range, *J. F. Rock*, no. 8986, in 1923; eastern slopes of Likang Snow Range, Yangtze watershed, *J. F. Rock*, no. 10891, in 1923–24; Tongtchouan, Tche-hai, alt. 2900–2990 m., *E. E. Maire*, June and August, 1916; without locality, *G. Forrest*, no. 10293.

SZECHUAN: Muli or Mili Kingdom, *J. F. Rock*, no. 11707, June, 1922.

CHEKIANG: hillsides, alt. 1330 m., *R. C. Ching*, no. 2400, August, 1924.

DISTRIBUTION: mountains of Formosa, Chekiang, Hupeh and westward through Szechuan and Yunnan.

This is the common Hemlock Fir of China being especially abundant on

the high mountains of Formosa and extreme western Szechuan. It is easily recognized by its emarginate leaves, the longest of which are often obscurely serrulate, and by its polished stipitate cones with stiff woody cone-scales bevelled and inclined to be incurved at the summit.

After a careful study of the mass of material in this herbarium, my field notes and knowledge of this Hemlock in the wild I cannot agree with Miss Downie in her recent attempt to establish a number of species of what she calls the CHINENSIS group. That such a wide spread species should exhibit a certain variation is to be expected but as I view it these variations are both trivial and unimportant. The lengthy and involved synonymy of this plant shows how greatly it has been misunderstood.

Pseudotsuga Carr.

Pseudotsuga Wilsoniana Hayata, Icon. Pl. Formos. v, 204, t. 15 (1915).—Kanehira, Formos. Trees, 614 (1917).

Pseudotsuga japonica Matsumura & Hayata in Jour. Coll. Sci. Tokyo. xxii. 400 (Enum. Pl. Formos.) (1906).—Hayata in Jour. Coll. Sci. Tokyo, xxv. art. 19, 223 (Fl. Mont. Formos.) (1908).—Not Shirasawa.

Pseudotsuga Forrestii Craib in Notes Bot. Gard. Edinburgh, xi. 189, fig. 160 (1919).

YUNNAN: mountains of Lonjre, Mekong-Salween watershed, adjoining southeastern Tibet, *J. F. Rock*, nos. 10260, 11625; sub jugo Doker-la, 28° 25', alt. 3000–3100 m., *H. Handel-Mazzetti*, no. 8058, September 19, 1915.

DISTRIBUTION: mountains of western Yunnan and of Formosa.

As pointed out in Jour. Arnold Arb. ii. 25–41 (1920) the relationship of the mountain flora of the island of Formosa is with western China. This *Pseudotsuga* forges another link in the chain of which the *Taiwania* and *Libocedrus macrolepis* Benth. & Hook. f. furnish other notable examples. So far as our meagre knowledge goes this *Pseudotsuga* is confined to the mountains of Formosa and those of extreme western Yunnan, whereas, the other Chinese species, *P. sinensis* Dode, is distributed sparingly from the coastal provinces to northeastern Yunnan. In herbaria it is not at all easy to distinguish any of the species of *Pseudotsuga*, the distinctions being both subtle and obscure. Craib in establishing his *P. Forrestii* points out that transverse section of the leaves show that the hypoderm is developed only immediately above and below the midrib and the epidermal cells are oblong. I find this character constant in many sections taken from Formosan and Yunnan specimens. It may be added that the resin-ducts are marginal and sub-epidermal. The endodermis is well-marked consisting of rounded thin-walled, bead-like cells; the margin is blunt in section, rayed idioblasts may or may not be present in the parenchyma; the epidermal cells are much thickened and uniform in character, the lower surface of the leaf is markedly papillose. Craib states that he had not seen *P. Wilsoniana* Hayata; if he had, the identity of his plant and Hayata's would have been apparent to him.

Morphologically *P. Wilsoniana* may be distinguished by its shining chestnut-brown or red-brown, sparsely pubescent, puberulous or glabrescent shoots, by its ciliate bud-scales, by its relatively thick leaves varying from 1.5 to 4.5 cm. in length, with midrib glaucous on the lower surface and the stomatic lines extending virtually to the margin of the leaf. Rarely is any green to be detected on the under surface of the leaf. The cone is erect, peduncled, ellipsoid to ovoid from 4–6 cm. long with a very prominent cuspid to the exerted deflexed bract. The seeds with the wing measure from 1.6–2 cm. in length, the base of the wing is cuneate with the apex rounded or abruptly obtuse.

We are without information as to the general appearance of this tree as it grows in Yunnan. During my travels in Formosa in 1917 and 1918 I saw only one tree of this *Pseudotsuga*. This was about 80 feet tall with a short trunk 12 feet in girth and three ascending stems so the real habit of the tree was obscured. The branches were relatively thin, horizontally spreading and slightly upturned toward the ends. The crown had no particular shape though it was more or less ovoid and flattened in outline. It was growing among various broad-leaf trees mostly belonging to the families Fagaceae and Lauraceae at an altitude of 4900 ft. in north-central Formosa. I was told of it being fairly common in several districts on that island where, owing to the unfriendly attitude of the savages, it was not possible for me to venture. Nevertheless, from what I could learn it was nowhere plentiful. Its altitudinal range is said to be from 4500 to 7000 ft. The sap and heart woods are clearly differentiated—the former is creamy white to pale yellow tinged with pink, the heart-wood is yellow-brown tinged pink. The annual rings are narrow but distinct; the specific gravity of the wood ranges from 0.57 to 0.72.

Pseudotsuga sinensis Dode in Bull. Soc. Dendr. France, 1912, 58. fig.; in Mitt. Deutsch. Dendr. Ges. xxi. 387 (1912).—Craib in Notes Bot. Gard. Edinburgh, xi. fig. 161 (1919).—Chun, Chin. Econ. Trees, 23 (1922).—Rehder in Bailey, Cult. Evergreens, 265 (1923).

YUNNAN: Tong-tchouan, alt. 2990 m., *E. E. Maire*, June, 1916; Tchou-scen-tsen, alt. 2990 m., *E. E. Maire*, March.

CHEKIANG: northeast of Tai-tuan, alt. 650 m., *R. C. Ching*, no. 2144, July, 1924.

ANHWEI: Wang shan, alt. 1200, *A. N. Steward*, no. 7195. August, 1924.

DISTRIBUTION: mountains of northeastern Yunnan; also of Chekiang and Anhwei provinces.

I have no personal knowledge of this *Pseudotsuga* which is an interesting illustration of the marked difference between the floras of eastern China and of Formosa and extreme western China. The type locality of *P. sinensis* Dode is the district of Tong-tchouan or Tung-ch'uan in north-eastern Szechuan. In Chekiang it is said by *R. C. Ching* to be very common at an altitude of 2000 ft. where it is a tree up to 120 ft. in height with

gray, deeply fissured bark. In Anhwei province Steward notes that he saw only one tree; it was growing in an open place and was 20 m. tall.

In herbaria this *Pseudotsuga* may be distinguished from the related *P. Wilsoniana* Hayata by its more pubescent shoots, by its much thinner leaves which show a raised green mid-rib and a distinct marginal line of green bordering the stomatic line, and by its seed which is smaller with a proportionately larger wing more obliquely narrowed to the apex. In transverse section the leaf of *P. sinensis* shows a well-marked continuous or virtually continuous hypoderm and the thinness of the leaf as compared with that of *P. Wilsoniana* is most marked. The epidermal cells are nearly as broad as long; the margin is sub-acute in section with sclerotic strengthening tissue present. Rayed idioblasts may or may not be present and the resin-ducts are marginal and subepidermal.

It may be stated here that the Japanese *Pseudotsuga japonica* Shirasawa is at once distinguished from the two Chinese species by its glabrous pale gray shoots, and by other marked differences.

Keteleeria Carr.

Keteleeria Davidiana Beissner, Handb. Nadelholzk. 424, fig. 117 (1891).—Van Tieghem in Bull. Soc. France, xxxviii. 412 (1891).—Pritzell in Bot. Jahrb. xxix. 217 (1900).—Masters in Jour. Linn. Soc. xxvi. 554 (1902); xxxvii. 421 (1906); in Gard. Chron. ser. 3, xxxiii. 84, fig. 37, 38 (1903); in Jour. Bot. xli. 270 (1903).—Mottet in Rev. Hort. 1904, 130, fig. 53.—Clinton-Baker, Illust. Conif. i. 72 t. (1909).—Henry in Elwes & Henry, Trees Great Brit. & Irel. vi. 1475 (1912).—Patschke in Bot. Jahrb. xlviii. 649 (1913).—Rehder & Wilson in Sargent, Pl. Wilson. ii. 39 (1914).—Kanehira, Formos. Trees, 602 (1917).—Chun, Chin. Econ. Trees, 24, fig. 8 (1922).—Rehder in Bailey, Cult. Evergreens, 247, fig. 64 (1923).—Silva Tarouca & Schneider, Uns. Freiland-Nadelhölz. ed. 2, 30, fig. (1923).—Dallimore & Jackson, Handb. Conif. 269, fig. 62 (1923).

Pseudotsuga Davidiana Bertrand apud Carrière in Rev. Hort. 1873, 37, fig. 3, 4, 5.—Bertrand in Ann. Sci. Nat. ser. 5, xx. 86 (1874).

Abies sacra David, Jour. Trois. Voy. Chin. ii. 29 (1875), name only.—Franchet in Nouv. Arch. Mus. Paris, sér. 2, vii. 100, t. 14 (Pl. David. i. 290, t. 14) (1884).

Pinus (Pseudotsuga) Davidiana McNab in Proc. Roy. Irish Acad. ser. 2, ii. 702 (1877).

Abies Davidiana Franchet in Nouv. Arch. Mus. Paris, ser. 2, vii. 98, t. 13 (Pl. David. i. 288, t. 13) (1884); in Jour. de Bot. xiii. 260 (1899).—Masters in Gard. Chron. ser. 3, i. 481 (1887).

Keteleeria sacra Beissner, Handb. Nadelholzk. 426 (1891).—Van Tieghem in Bull. Soc. Bot. France, xxxviii. 412 (1891).—Mottet in Rev. Hort. 1904, 130.—Patschke in Bot. Jahrb. xlviii. 649 (1913).

Keteleeria Delavayi Van Tieghem in Bull. Soc. Bot. France, xxxviii. 412 (1891), nomen seminudum.

Podocarpus sutchuenensis Franchet in Jour. de Bot. xiii. 265 (1899).—Pritzell in Bot. Jahrb. xxix. 213 (1900).—Masters in Jour. Linn. Soc. xxvi. 548 (1902); xxxvii. 414 (1906).

Pinus sacra Voss in Mitt. Deutsch. Dendr. Ges. xvi. 94 (1907).

Keteleeria formosana Hayata in Gard. Chron. ser. 3, XLIII. 194 (1908).

Keteleeria Davidiana var. *formosana* Hayata in Jour. Coll. Sci. Tokyo, xxv. art. 19, 221 (Fl. Mont. Formos.) (1908).

Keteleeria Esquirolii Léveillé in Fedde, Rep. Spec. Nov. VIII. 60 (1910).

YUNNAN: Puerhfu, alt. 2150 m., *J. F. Rock*, no. 2888, March, 1922; watershed of the Black River or Papienho, between Mopo and Man-pieh, alt. 1450 m., *J. F. Rock*, nos. 2975, 2922, March-April, 1922; high plateau between Talifu and Likiang, *J. F. Rock*, nos. 3213, 6321, May and August, 1922; mountains south of Likiang, Sungkwe Hochin Range, *J. F. Rock*, nos. 8289, 10892, in 1923; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8172, March, 1923; region of Tungshan, Yangtze drainage basin, east of Likiang, *J. F. Rock*, no. 11711, in 1923; between Likiangfu and Yunnanfu, via Youngpei, Hwaping, Magai and Wuting, *J. F. Rock*, no. 11729, March, 1924; Szemao, alt. 1600 m., *A. Henry*, nos. 12734, 12855; Tong-tchouan, Kin-tschong-chan and Tche-hai, alt. 2990 m., *E. E. Maire*, March, April, June, 1916; Yunnanfu, *C. Schneider*, nos. 61, 118, 4031, Feb.-March, 1914; without locality, *G. Forrest*, nos. 10230, 11425.

DISTRIBUTION: mountains of Formosa and in Hupeh, Kweichou, Szechuan and Yunnan.

This Yunnan material presents all the variations mentioned by Rehder & Wilson but there is no mistaking it as belonging to one species only. In many of the specimens the leaves are very glaucous on the lower surface and this character is particularly noticeable on young foliage. The cone-scales are often more or less erose, varying greatly in this character which is especially pronounced in Rock's no. 8289.

This tree is evidently very plentiful throughout Yunnan as it is also in Hupeh and Szechuan; in Formosa on the other hand I found it to be quite rare. *Tsuga Mairei* Lemée & Léveillé (in *Monde des Pl.* xvi. 20 [1914]) probably belongs here.

Keteleeria Evelyniana Masters in Gard. Chron. ser. 3, XXXIII. 194, fig. 82 (1903).—Beissner in Mitt. Deutsch. Dendr. Ges. XII. 66 (1903).

Pinus Evelyniana A. Voss in Putlitz & Meyer, Landlex. iv. 773 (1913).

YUNNAN: Yuanchiang, alt. 1300 m., *A. Henry*, no. 11815.

DISTRIBUTION: Yunnan, endemic.

In all probability this is nothing more than a condition of the widespread and exceedingly variable *K. Davidiana* Beissn.

Abies Juss.

Abies Beissneriana Rehder & Wilson in Sargent, Pl. Wilson. II. 46 (1914).—Chun, Chin. Econ. Trees, 30 (1922).—Rehder in Bailey, Cult. Evergreens, 254 (1923).—Dallimore & Jackson, Handb. Conif. 87 (1923).

YUNNAN: Yangtze watershed, prefectural districts of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, nos. 3811, 8375, May and October, 1923–24; between Tengyueh and Likiangfu, via Shweshanting, Kantingai,

Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8141, March, 1923; Mount Kenyichunpo and region of Chemputong, Salween-Irrawadi watershed, *J. F. Rock*, no. 11518, in 1923; without locality *G. Forrest*, no. 10281; between Yungning and Yungpeh, *C. Schneider*, no. 1648, June 23, 1914.

DISTRIBUTION: mountains of northwest Yunnan northward to Muping in western Szechuan.

In *Plantae Wilsonianae* a full account of this species is given. The specimens cited above call for no special remark. *Rock's* no. 8375 has male flowers which show that the pollen sacks are yellow. His No. 11518 has leaves up to 7.5 cm. long and is evidently from a young plant. The gray polished character of the shoots and the lustrous green upper surface of the leaves is well-marked. Among the Chinese *Abies* this species is most closely related to *A. chensiensis* Van Tieghem, a native of northwestern Hupeh and southern Shensi.

As Rehder points out (in *Jour. Arnold Arb.* i. 54 (1919)) the name *Abies Beissneriana* Rehder & Wilson is not invalidated by the earlier *A. Beissneriana* Mottet which is a non-valid name having been given to a hybrid already provided with a specific name.

Abies Delavayi Franchet in *Jour. de Bot.* xiii. 255 (1899).—Masters in *Jour. Linn. Soc.* xxvi. 557 (1902); in *Gard. Chron.* ser. 3, xxxix. 212, fig. 82 (1906); in *Jour. Linn. Soc.* xxxvii. 422 (1906).—Beissner, *Handb. Nadelholzk.* ed. 2, 194 (1909).—Diels in *Notes Bot. Gard. Edinburgh*, xxxi. 252 (Pl. Chin. Forrest.) (1912).—Patschke in *Bot. Jahrb.* xlviii. 642, fig. 3, (1913).—Rehder & Wilson in *Sargent, Pl. Wilson.* ii. 41 (1914).—Craib in *Notes Bot. Gard. Edinburgh*, xi. 277, fig. 163 (1919).—Chun, *Chin. Econ. Trees*, 27, fig. 10 (1923), exclud. synon.—Rehder in *Bailey, Cult. Evergreens*, 254 (1923).—Dallimore & Jackson, *Handb. Conif.* 97 (1923).—Silva Tarouca & Schneider, *Uns. Freiland-Nadelh.* ed. 2, 28, fig. 28 (1923).

Keteleeria Fabri Masters in *Jour. Linn. Soc.* xxvi. 555 (1902); in *Gard. Chron.* ser. 3, xxxiii. 194 (1903); in *Jour. Linn. Soc.* xxxvii. 421 (1906).—Mottet in *Rev. Hort.* 1904, 130.—Beissner, *Handb. Nadelholzk.* ed. 2, 203 (1909).—Patschke in *Bot. Jahrb.* xlviii. 649 (1913).

Abies Fargesii Masters in *Gard. Chron.* ser. 3, xxxix. 213, fig. 83 (1906); in *Jour. Linn. Soc.* xxxvii. 422 (1906).—Not Franchet.

Pinus Fabri Voss in *Putlitz & Meyer, Landlex.* iv. 773 (1913).

Abies Faberi Craib in *Notes Bot. Gard. Edinburgh*, xi. 278, fig. 164 (1919).

YUNNAN: Drainage Basin of Erhhai (Lake of Talifu), Tsangshan Range, *J. F. Rock*, no. 3148, April 13–25, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8068, March, 1923; Shweli River drainage basin to summit of Shweli-Salween watershed east of Tengyueh, *J. F. Rock*, no. 7652, November, 1922; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, nos. 10886, 10887, in 1923–24; between Hunka and Woloho, alt. 3000–3500 m., *C. Schneider*, no. 1533, June 13, 1914; Yen-yuan

Hsien, alt. 3300–3900 m., *C. Schneider*, nos. 3574, 3563, May, 1914; without locality, *G. Forrest*, no. 11898.

DISTRIBUTION: western Yunnan northward to Wen-ch'uan Hsien in western Szechuan.

The acquisition of ample Yunnan material collected by Rock and Schneider, as well as those of Forrest's in this herbarium, has enabled me to investigate again the leaf anatomy of this species. Mr. Craib (in Notes Bot. Gard. Edinburgh, xi. 278 (1919) separates the Szechuan tree under the name of *A. Faberi* from the typical *A. Delavayi* Franch. found in Yunnan basing his distinctions mainly on the excessive curling back of the leaf margins noticeable on Forrest's material and on Delavay's type specimen as opposed to the slightly recurved almost plane leaves on Szechuan material notably my No. 2089. The differences in the degree of recurving of the leaf-margin pointed out by Mr. Craib are present and indeed obvious on many specimens but I find every intermediate condition, moreover, in my No. 2093 collected in Mupin the leaf-margins on one part of the specimen are folded back almost to the mid-rib, on another part of the same branch the leaf margin is only slightly recurved and here and there the leaves are almost plane. The resin-ducts vary slightly in size but not in position. Contrary to Mr. Craib's statement I find the leaf-margin of the strongly recurved condition more acute in cross-section than when the leaf is plane or with the margin only slightly recurved. The strong recurving of the leaf-margin serves doubtless as protection from loss of moisture by excessive transpiration, but in herbarium specimens this obvious character may be much exaggerated by careless drying, for instance, by allowing the branch to wilt or by not drying it under greater pressure.

This further study confirms the opinion set forth in *Plantae Wilsonianae* II. 41 (1914). I find no constant characters by which to separate the specimens collected in Szechuan from those collected in Yunnan by Delavay, Forrest, Rock and others.

Abies Forrestii C. C. Rogers in Gard. Chron. ser. 3, LXV. 150 (March 29, 1919).—W. C. Craib in Notes Bot. Gard. Edinburgh, xi. 279 t. 162 (November, 1919).—Rehder in Bailey, Cult. Evergreens, 254 (1923).—Dallimore & Jackson, Handb. Conif. 101 (1923).

YUNNAN: Yangtze watershed, prefectural district of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, nos. 3792, 10673, May and October, 1922; between Tengyueh and Likiangfu, via Shweshanting, Kantingai, Feilungkiao-Yunlung, Lanping, Chienchuan, and Likiang, *J. F. Rock*, no. 8157, March, 1923; between Chienchuan plain and the Mekong drainage basin to Lachiming, *J. F. Rock*, no. 8611, May, 1923; Lotueshan mountains of Lakako, west of the Yangtze bend at Shiku, *J. F. Rock*, no. 9543, in 1923; without locality, *G. Forrest*, nos. 10152, 10206, 10225.

DISTRIBUTION: high mountains of northwest Yunnan; not recorded from elsewhere.

This is a well-marked species distinguished by its very resinous winter-buds, by the rufous brown short hispid pubescence on the shoots, by its cylindric violet-purple, medium-sized cone, non-resinous and with short-exserted bracts. It is perhaps most closely related to the Himalayan *A. spectabilis* Spach (*A. Webbiana* Lindl.) which has similar pubescence on the shoots, but is much larger in all its parts, the leaves on adult trees being much longer and the cone twice the size with the bracts not exserted.

On material before me of *Abies Forrestii* the leaves are distinctly petiolate and vary from 1.5 to 3 cm. in length, are emarginate with the margin slightly recurved. In the cross section the leaves show a much thickened continuous hypoderm often in two layers with lateral sub-epidermal resin-canals of medium size and a number of sclerotic cells at the margin which is blunt in cross section. The endodermis is definite and the epidermis on the lower surface is very thick-walled.

The undescribed cone is sessile, violet-purple, non-resinous, cylindric 8.5 cm. high, about 4 cm. broad and the scales are about 1 cm. high, 1.5 to 2 cm. broad, thin and incurving at the summit. The bracts are slightly exserted and have a narrow-lanceolate acuminate cuspid outthrust and more or less recurved. The seed is dark purplish and with the hatchet shape wing is about 1.5 cm. long. This description is drawn from Rock's no. 10673. In young and half grown cones the lanceolate cuspid is bristle-like and more conspicuous. The white stomatic lines on the undersurface of the leaves are very conspicuous. The pollen-sacs are deeply tinged with violet-purple.

This species is usually ascribed to Craib but the description by C. C. Rogers which appeared six months earlier is quite sufficient to identify this distinct and well-marked Fir.

Subfam. TAXODIEAE Parl.

Cunninghamia R. Br.

Cunninghamia lanceolata Hooker in Bot. Mag. LIV. 7. 2743 (1827).—Rehder & Wilson in Sargent, Pl. Wilson. II. 50 (1914), where full references to synonymy and literature will be found.

YUNNAN: Plain of Tche-hai, alt. 2900 m., *E. E. Maire*, April; Mengtsze, mountains to the southeast, alt. 1600 m., *A. Henry*, no. 9148A.

DISTRIBUTION: China, south of the Yellow River from the extreme east to the west but not ascending above 2500 m.

More generally known as *Cunninghamia sinensis* R. Br., this is the most useful of all Chinese softwood trees, being employed in all branches of carpentry. The above are the only specimens in this herbarium collected in the province of Yunnan but during my visit there in 1899 I noted it as a common tree.

A synonym not recorded by Rehder & Wilson is *Cunninghamia sinensis* var. *prolifera* Lemée & Lévillé in Monde des Pl. 1914, 20. Proliferous cones are frequently found on any *Cunninghamia* tree.

Taiwania Hayata

Taiwania cryptomerioides Hayata in Jour. Linn. Soc. xxxvii. 330 t. 16 (1906); in Tokyo Bot. Mag. xxi. 21, t. 1. fig. 23 (1907).—Beissner, Handb. Nadelholzk. ed. 2, 484 (1909).—Clinton-Baker, Ill. Conif. iii. 75, t. (1913).—Kanehira, Formos. Trees, 615, fig. (1917).—Bean in Gard. Chron. ser. 3, lxxviii. 213, fig. 99 (1920).—Handel-Mazzetti in Zeitschr. Gart. Obstb. 1. Gartenb. i. 25-27 (1920).—Rehder in Bailey, Cult. Evergreens, 237, fig. 58 (1923).—Dallimore & Jackson, Handb. Conif. 496 (1923).—Sorger in Oesterr. Bot. Zeitschr. lxxiv. 81, figs. (1925).

Taiwanites Hayata in Gard. Chron. ser. 3, xxxix. 165 (1906).

YUNNAN: Watershed of the Salween and Irrawadi Rivers, alt. 2250 to 2800 m., *H. Handel-Mazzetti*, nos. 8915, 9664, June and August, 1916.

DISTRIBUTION: mountains of Formosa and those of extreme northwestern Yunnan.

Dr. Handel-Mazzetti's finding of *Taiwania* in northwestern Yunnan is one of the most interesting discoveries in recent work on the Chinese flora. He gives the exact locality as near Ninalo west of Chamnutung, which is west of Tsekou on the Salween River. There in side valleys between 2300 and 2800 m. altitude he found giant trees which in habit and bark reminded him of *Sequoia*. The occurrence of *Taiwania*, of *Libocedrus macrolepis* Benth. & Hook. and of *Pseudotsuga Wilsoniana* Hayata, in western China and on the mountains of Formosa and at no place in between these widely separated regions is a remarkable fact in plant distribution. Since so little is known about the *Taiwania* perhaps a few words about it as it grows in Formosa may be welcome.

On Arisan in central Formosa the *Taiwania* grows scattered through the forests of *Chamaecyparis formosensis* Matsum., *C. obtusa* var. *formosana* Hay., *Trochodendron aralioides* S. & Z., evergreen Oaks, Lauraceae, Symplocos and evergreen shrubs in a narrow belt between 7000 and 8000 ft. altitude. In my opinion it formed in ancient times forests with the *Trochodendron* but has been defeated in the struggle by the two *Chamaecyparis* and the present trees are mere survivals. On Matsu-yama, a mountain in the Arisan forest reservation, it is more common than on Arisan itself. On Hsokei-hen, a forest reservation belonging to the Imperial University, Tokyo, it grows in small groups among evergreen Oaks. So far as my own observations go it is everywhere in Formosa a rare tree. Small trees are very uncommon and seedlings extraordinarily rare. The young trees have pendent branches and in the shade of the forests the branches are sparse and the tree unattractive. In the open it is a singularly beautiful and attractive Conifer densely branched, has graceful handsome branchlets and attractive green leaves. Tall trees in the forests are strikingly distinct but singularly like old *Cryptomeria* trees, and both suggest gigantic Lycopods. In the dense forests the crown is small, domeshape, oval or flattened, the branches few and small and one wonders how so little leafage can support so gigantic a tree. When the top is broken lateral branches

assume an erect position. In more open forests the branches are massive and wide-spreading but the crown is thin. In height the *Taiwania* overtops all other trees on Arisan and probably attains upwards of 200 ft. The highest I measured was 190 ft. tall and 130 ft. to the first branch. The girth is up to 30 ft.; the trunk is straight and mast-like, buttressed at the base. The bark is grey and thin, smooth and longitudinally fissured. The wood when green is heavier than water, when air dried its specific gravity is 0.46. There is very little sap wood which is pale in color; the heart wood is a rich mahogany brown with a purplish sheen becoming duller with exposure and age. It is strong, easily worked, but is not very durable. The trees are usually solid.

The *Taiwania* is essentially a light demanding tree and in Formosa favors northerly and northeasterly exposures. It is polygamo-dioecious and fruit is only found on the tops of the oldest trees. Male flowers on some trees are extraordinarily abundant. It sheds its small inner branchlets after the manner of *Cryptomeria*, *Cunninghamia* and *Sequoia* and is a very close relative of the latter.

I was fortunate enough to secure in 1918 three young seedling plants in the forests of Arisan and from the forestry officials at Keitao obtained a small nursery grown plant. All four were safely brought to the Arnold Arboretum. The plant roots easily from cuttings.

During my visits to Formosa I collected a great many seeds of the *Taiwania* but none of them proved viable. In the late autumn of 1924, through the good services of my friend, R. Kanehira, the Arnold Arboretum received seeds which germinated quickly and we now have a nice stock of young plants. On these seedlings the normal number of cotyledons is two, but occasionally three are present.

Cryptomeria D. Don

Cryptomeria japonica D. Don in Trans. Linn. Soc. xviii. 167, t. 13, fig. 1 (1841).—Rehder & Wilson in Sargent, Pl. Wilson. II. 52 (1914).—Wilson, Conif. & Taxads Jap. 66, tt. 48–49 (1916), where complete references to the literature and a full account of this tree will be found.

Cupressus japonica Linnaeus f., Suppl. 421 (1781).—Thunberg, Fl. Jap. 265 (1784).

Taxodium japonicum Brongniart in Ann. Sci. Nat. xxx. 183 (1833), excluding var. *heterophylla*.

Cryptomeria Fortunei Otto & Dietrich in Allg. Gartenz. 1853, 234.

Cryptomeria japonica var. *japonica* Henry in Elwes & Henry, Trees Gr. Brit. Irel. I. 129 (1906).

Cryptomeria Kawaii Hayata in Tokyo Bot. Mag. xxxi. 117, figs. (1917).

YUNNAN: Mengtsze, temple grounds, alt. 1950 m., *A. Henry*, nos. 9667, 9667A; without locality, *E. E. Maire*.

DISTRIBUTION: Japan; often cultivated in the warmer parts of China more especially in the grounds surrounding temples and monasteries.

Authentic specimens from trees truly wild in China are unknown and there is no reliable record of any one having seen an indigenous tree any-

where in the Chinese empire. In *Plantae Wilsonianae* I expressed the opinion that it would appear highly improbable that the *Cryptomeria* had been introduced to the remote sparsely populated regions northwest of the Chengtu plain from Japan or eastern China. In the year 1914 during my travels through Japan I made an exhaustive study of *Cryptomeria* and this study was continued during the years 1917 and 1918 when again visiting the Orient. It is now my matured opinion that *Cryptomeria* is purely a Japanese tree and that its occurrence in China is due to it having been brought there from Japan in the first instance by Buddhist priests or proselytes. When in Japan in 1917, Dr. B. Hayata showed me the type specimens of his *C. Kawaii*. To me they did not look different from material I could have gathered from trees in any good sized grove of *Cryptomeria* in Tokyo or elsewhere in Japan. The armature of the cone scale in *Cryptomeria* is notoriously variable, and the size of the cone also varies a good deal. Maire's specimen cited above agrees almost exactly with that collected by Professor S. Kawaii. Under cultivation in Japan many distinct varieties of this tree have appeared exhibiting marked variation in habit, foliage and consequently in general appearance. It is, in Japan, the most all round useful softwood timber and in this respect finds an analogue in China in *Cunninghamia lanceolata* Hook. For afforestation purposes *Cryptomeria* is being planted in enormous quantities on the mountains of Formosa; for like purposes it is being experimented with in many parts of India, Africa and Australia. The only place in which I have seen it flourishing in all these lands was on the rain-soaked outer ranges of the Himalayas in and round Darjeeling.

Subfam. CUPRESSEAE Lindl.

Cupressus L.

Cupressus Duclouxiana Hickel in Camus, Les Cypres, 91, t. 3, figs. 419-424 (1914).—Dallimore & Jackson, Handb. Conif. 195 (1923).—Stapf in Bot. Mag. CL. t. 9049 (1925).

Cupressus sempervirens Franchet in Jour. de Bot. XIII. 263 (1899).—Not Linnaeus.

Cupressus torulosa Rehder & Wilson in Sargent, Pl. Wilson. II. 54 (1914), excluding all references and synonyms.—Hayata in Tokyo Bot. Mag. XXXI. 118 (1917).—Chun, Chin. Econ. Trees, 38, fig. 12 (1922).—Rehder in Jour. Arnold Arb. IV. 125 (1923).—Not D. Don.

YUNNAN: Yangtze watershed, Prefectural districts of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 3987, May-October, 1922; west of Talifu, Mekong watershed, en route to Youngchang and Tengyueh, *J. F. Rock*, no. 6802, September-October, 1922; Shweli River drainage basin and environs of Tengyueh, *J. F. Rock*, no. 7921, February, 1923; Lotueshan, mountains of Labako, west of the Yangtze bend at Shiku, *J. F. Rock*, no. 8440, in 1923; mountains of Londjre, Mekong-Salween watershed, adjoining southeastern Tibet, *J. F. Rock*, no. 11645, in 1923; Yunnanfu, *C. Schneider*, no. 46, February, 1914; Yen-yuan Hsien, Kalapa, alt. 3000

m., *C. Schneider*, no. 3568, May, 1914; between Yungning and Chungtien, alt. 3200 m., *H. Handel-Mazzetti*, no. 7602, August, 1915; without locality, *E. E. Maire*; without locality, *G. Forrest*, no. 8166.

SZECHUAN: valley of the Tung River, alt. 1300-2600 m., *E. H. Wilson*, no. 2106, Veitch Exped. no. 3012, June, July & August, 1908, July, 1904; valley of the Min River, Wa-ssu country, Wen-chuan Hsien, alt. 1600 m., *E. H. Wilson*, no. 798A, November, 1908; near Mao-chou, alt. 1800 m., *E. H. Wilson*, no. 2105, May, 1908.

KANSU: near Chu kun, *F. N. Meyer*, no. 1981, October, 1914.

CULTIVATED: Hort. P. D. Williams, St. Keverne, Cornwall; Hort. Allard, Angers, July, 1922.

Distribution: western Yunnan northward through western Szechuan to southern Kansu, chiefly in arid warm valleys and often cultivated in temple grounds.

Since 1914 I have had the advantage of seeing many trees of the real *C. torulosa* D. Don cultivated in different parts of the world, and now realize that my colleague and I were in error in referring my Chinese material to the Himalayan Cypress. M. Hickel's Chinese species is very distinct and may easily be recognized by its very slender branchlets and large globose and sub-globose cones usually 2-2.5 cm. in diam.; occasionally they are less than 1 cm. long and broad, but this is very unusual. The Himalayan species has smaller cones, always longer than broad, and gray fibrous fissured bark.

Cupressus funebris Endlicher, Syn. Conif. 58 (1847).—Parlatore in De Candolle, Prodr. xvi. pt. II. 471 (1868).—Debeaux in Act. Soc. Linn. Bordeaux, xxx. 110 (Fl. Shangh. 58) (1875).—Masters in Jour. Linn. Soc. xviii. 496 (1881); xxvi. 540 (1902); xxxvii. 412 (1906); in Jour. Bot. xli. 268 (1903).—Kanitz in Szèchenyi, Keletazs. Utján. Tudom. Ered. II. 847 (Pl. Enum. 63) (1891); Wiss. Ergeb. Reise Szèchenyi, II. 738 (1898).—Franchet in Jour. de Bot. xiii. 263 (1899).—Pritzl in Bot. Jahrb. xxix. 219 (1900).—Pavolini in Nuov. Giorn. Bot. Ital. n. ser. xv. 439 (1908).—Henry in Elwes & Henry, Trees Gr. Brit. & Irel. v. 1162 (1910).—Patschke in Bot. Jahrb. xlviii. 675, t. 8, fig. 6 (1913).—Hayata in Tokyo Bot. Mag. xxxi. 118 (1917).—Chun, Chin. Econ. Trees, 38 (1922).—Rehder in Bailey, Cult. Evergreens, 211, fig. 34 (1923).—Dallimore & Jackson, Handb. Conif. 197, fig. 38 (1923).

Cupressus pendula Abel in Staunton, Embassy to China, II. 265 (1797), name only.—Not Thunberg, nor L'Héritier.

Cupressus funebris gracilis Carrière, Traité Conif. 162 (1867).

YUNNAN: district of Yunnanfu, *O. Schoch*, no. 425 (1916).

DISTRIBUTION: China, widely distributed from the seacoast to the extreme west being especially abundant in the valley of the Yangtsze River.

This is the only specimen we have seen from Yunnan of this common and wide-spread Chinese tree.

Fokienia Henry and Thomas

Fokienia Kawaii Hayata in Tokyo Bot. Mag. xxxi. 116, fig. (1917).

YUNNAN-TONKIN BORDER, *S. Kawai*, January, 1917 (co-type specimen).

DISTRIBUTION: forests of the Yunnan-Tonkin border.

On the above specimen, which is the only one I have seen, the cones are much smaller than those of *F. Hodginsii* Henry & Thomas.

Thuja L.

Thuja orientalis Linnaeus, Spec. 1002 (1753).—Rehder & Wilson in Sargent, Pl. Wilson. II. 53 (1914) where full citations of literature and synonymy are given.

Thuja orientalis f. *Kawaii* Hayata in Tokyo Bot. Mag. xxxi. 118 (1917).

YUNNAN: Yangtze watershed, Prefectural district of Likiang, eastern slopes of Likiang Snow Range, *J. F. Rock*, no. 4660, May–October, 1922; mountains of Londjre, Mekong-Salween watershed, adjoining southeastern Tibet, *J. F. Rock*, nos. 9402, 11646, in 1923; Yuanchang, alt. 2000 m., *A. Henry*, no. 13353; valley of the Mekong, alt. 2050–2200 m., *H. Handel-Mazzetti*, nos. 7983, 7970, September, 1915; without locality, *E. E. Maire*; Yunnanfu, *F. Ducloux*, no. 6251, January, 1909.

SZECHUAN: Lung-chu-shan, *C. Schneider*, no. 850, April, 1914.

DISTRIBUTION: China, exact habitat unknown; long cultivated and escaped, in China, Manchuria and Korea, cultivated in Japan.

In this herbarium there is much material of this tree, but whether collected from escaped and naturalized or really spontaneous specimens we do not know. In my own travels through the Orient I never saw a spontaneous example. It has been cultivated by the Chinese from time immemorial and in by-gone days was a feature of the gardens of princes and the tombs of emperors. At the New Year the fragrant branches are used to symbolize long life and happiness; the fruit and leaves were formerly much used in Chinese medicine. The tree is a favorite with both Taouists, Buddhist and Confucian priests which accounts for its wide spread cultivation in China, Korea and Japan. In Peking may be seen some magnificent specimens planted more than six hundred years ago with enormous burlled trunks and flattened rounded, wide-spreading crowns of huge branches.

Libocedrus Endl.

Libocedrus macrolepis Benthams & Hooker, Gen. Pl. III. 426 (1880).—Masters in Jour. Linn. Soc. xviii. 485 (1881); in xxvi. 540 (1899); in Gard. Chron. ser. 3, xxx. 467 (1901).—Kent in Veitch, Man. Conif. 255 (1900).—Henry in Garden, LXII. 183, fig. (1902); in Elwes & Henry, Trees Gr. Brit. Irel. III. 488 (1908).—Hayata in Jour. Coll. Sci. Tokyo, xxv. art. 19, 207, fig. 4 (Pl. Mont. Formos.) (1908).—W. in Gard. Chron. ser. 3, XLIV. 148 (1908).—Beissner, Handb. Nadelholzsk. ed. 2, 493 (1909).—Henry and Thomas in Gard. Chron. ser. 3, XLIX. 67, fig. 34 (1911).—Kanehira, Formos.

Trees, 602, fig. (1917).—Chun, Chin. Econ. Trees, 34 (1922).—Rehder in Bailey, Cult. Evergreens, 221 (1923).—Dallimore & Jackson, Handb. Conif. 305 (1923).

Calocedrus macrolepis Kurz in Jour. Bot. xi. 196, t. 133, fig. III. (1873).

Thuja macrolepis Voss in Mitt. Deutsch. Dendr. Ges. xvi. 88 (1907).

YUNNAN: Talang, alt. 1600 m., *A. Henry*, no. 11566; Szemao, alt. 1400 m., *A. Henry*, nos. 11566A, 11566B.

DISTRIBUTION: mountains of northern Formosa and of southwestern Yunnan.

This *Libocedrus* appears to be a rare tree in Yunnan and confined to rather low altitudes. On my visit to Szemao in 1899 I saw several trees but none of any size. In general appearance they strongly resemble the Chinese *Arbovitae* (*Thuja orientalis* L.). From one tree on the outskirts of Szemao I obtained good seeds which I sent to Messrs. Veitch with whom they germinated in 1900. None of the collectors in northwest Yunnan have sent back material of this tree and it would appear to be confined to the southwestern part of the province. In Formosa the range of this tree is from the central parts northward, between elevations of from about 150 to 1500 m. but it is nowhere common. Where I saw the tree in 1918 was in mixed evergreen broad-leaf forests beyond Urai in the Taihoku prefecture. There it is extremely rare but some distance to the northwest it is said to be more plentiful, but today the *Libocedrus* is certainly not a common tree in Formosa. Those I saw were growing on the face of cliffs or on the edge of sharp rock ledges in almost inaccessible places. The largest tree was about 70 ft. tall with a trunk 10 ft. in girth but I saw stumps of felled trees from 16 to 18 ft. in girth. In these forests it is never a striking nor a handsome tree. The crown is broad, more or less flattened but rather sparse, made up of several thick main branches and many thin branches of secondary order. The branches are spreading, horizontal or slightly ascending. The wood is fragrant, with very narrow annual rings and the sap wood merges into the heart wood without any sharply defined color distinction. The sap wood is pale yellowish to brownish, the heart wood is darker in shade. In texture it is close-grained and elastic. It is easily worked and when smoothed by a plane becomes lustrous. It is very durable, especially underground, and is not attacked by Termites. Its specific gravity is 0.62 to 0.69. For cabinet-work, furniture, and interior fittings, *Libocedrus* wood is the best and most valuable produced in Formosa. The sawdust is used in the manufacture of incense sticks and the bark is valued for roofing purposes. Until about 1908 this most valuable tree was quite common in the forests of the Taihoku prefecture.

Juniperus L.

Sect. *OXYCEDRUS* Spach.

Juniperus formosana Hayata in Jour. Coll. Sci. Tokyo, xxv. art. 19, 209, t. 38 (Fl. Mont. Formos.) (1908); Icon. Pl. Formos. vii. 39, fig. 25

(1918).—Henry in Elwes & Henry, *Trees Great Brit. & Irel.* vi. 1415 (1912).—Bean, *Trees Shrubs Brit. Isles*, i. 672 (1914).—Rehder & Wilson in Sargent, *Pl. Wilson.* ii. 56 (1914).—Kanehira, *Formos. Trees*, 600, fig. (1917).—Chun, *Chin. Econ. Trees*, 41 (1922).—Rehder in *Jour. Arnold Arb.* iv. 126 (1923); in Bailey, *Cult. Evergreens*, 197 (1923).—Dallimore & Jackson, *Handb. Conif.* 247 (1923).—Silva Tarouca & Schneider, *Uns. Freiland-Nadelhölz.* ed. 2, 31, fig. (1923).

Juniperus taxifolia Parlatore in De Candolle, *Prodr.* xvi. pt. ii. 481 (1868), as to Fortune's specimen no. 47.—Pritzel in *Bot. Jahrb.* xxix. 219 (1900).—Beissner in *Bull. Soc. Bot. Ital.* 1901, 360.—Masters in *Jour. Linn. Soc.* xxvi. 543 (1902); xxxvii. 413 (1906); in *Jour. Bot.* xli. 268 (1903).—Matsumura & Hayata in *Jour. Coll. Sci. Tokyo*, xxii. 403 (*Enum. Pl. Formos.*) (1906).—Patschke in *Bot. Jahrb.* xlviii. 678 (1913), in part.—Not Hooker & Arnott.

Juniperus rigida Beissner in *Nuov. Giorn. Bot. Ital.* n. ser. iv. 186 (1897).—

Franchet in *Jour. de Bot.* xiii. 264 (1899).—Masters in *Jour. Bot.* xli. 268 (1903); in *Jour. Linn. Soc.* xxxvii. 413 (1906).—Patschke in *Bot. Jahrb.* xlviii. 678 (1913), in part.—Not Siebold & Zuccarini.

Juniperus communis Franchet in *Jour. de Bot.* xiii. 264 (1899).—Not Linnaeus.

Juniperus Mairei Lemée & Lévillé in *Monde des Pl.* 1914, 20.

YUNNAN: high plateau between Talifu and Likiang to the foot of the Likiang Snow range, *J. F. Rock*, no. 3243, May 6–11, 1922; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow range, *J. F. Rock*, no. 3630, May–October, 1922; Mountains south of Likiang, Sungkwe Hochin Range, *J. F. Rock*, nos. 8297, 11680, in 1923; eastern slopes of Likiang Snow Range, Yangtsze watershed, *J. F. Rock*, no. 11475, in 1923–24; between Talifu and Likiang, alt. 2000–2600 m., *H. Handel-Mazzetti*, no. 6438, May, 1915; Tcheou-kia-ouan, alt. 2990 m., *E. E. Maire*, April; Suen-oui, alt. 2600 m., *E. E. Maire*, August.

SZECHUAN: between Liuku and Kuapu, alt. 2800 m., *C. Schneider*, no. 1319, May, 1914; Yen-yuan Hsien, Kalapa, alt. 3000 m., *C. Schneider*, no. 1242, May, 1914; between Oti and Ouen-tin, alt. 2800–3200 m., *C. Schneider* no. 1182, June, 1914.

DISTRIBUTION: mountains of Formosa and of China throughout the warmer parts from the eastern sea-board to the extreme west.

In Kansu and some of the extreme northern parts of China the black-fruited *Juniperus rigida* S. & Z. has been recently collected by R. C. Ching (nos. 93, 101), but throughout all the warmer parts *J. formosana* appears to be the only member of the section *Oxycedrus* Spach indigenous there. Messrs. Rehder & Wilson have discussed this species and the material before me adds nothing to what they have written.

Sect. SABINA Spach

Juniperus squamata Buchanan-Hamilton apud Lambert, *Descr. Gen. Pinus*, ii. 17 (1824).—D. Don, *Prodr. Fl. Nepal.* 55 (1825).—Spach in *Ann. Sci. Nat. sér.* 2, xvi. 293 (1841).—Endlicher, *Syn. Conif.* 18 (1847).—Brandis, *For. Fl. Brit. Ind.* 537 (1874).—Henry in Elwes & Henry, *Trees Great Brit. & Irel.* vi. 1420 (1912).—Rehder & Wilson in Sargent, *Pl.*

Wilson. II. 57 (1914).—Rehder in Bailey, Cult. Evergreens, 199 (1923).—Dallimore & Jackson, Handb. Conif. 260 (1923).

Juniperus religiosa Royle, Ill. I. 351 (1839), name only.

Juniperus Lambertiana Wallich mss. ex Endlicher, Syn. Conif. 19 (1847), as a synonym.

Juniperus rigida Wallich mss. ex Endlicher, Syn. Conif. 19 (1847), as a synonym.

Sabina squamata Antoine, Cupress. 66, t. 90 (1857), in part.

Juniperus recurva β. *squamata* Parlatore in De Candolle, Prodr. XVI, pt. II. 482 (1869).—Hooker f., Fl. Brit. Ind. v. 647 (1888).—Masters in Jour. Linn. Soc. XXVI. 543 (1902); XXVII. 413 (1906); in Jour. Bot. XLI. 268 (1903).—Patschke in Bot. Jahrb. XLVIII. 678 (1913).

Juniperus recurva Franchet in Nouv. Arch. Mus. Paris, sér. 2, VII. 102 (Pl. David. I. 292 (1884); in Jour. de Bot. XIII. 263 (1899).—Beissner in Nouv. Giorn. Bot. Ital. n. ser. IV. 186 (1907).—Pritzel in Bot. Jahrb. XXIX. 219 (1900).—Patschke in Bot. Jahrb. XLVIII. 678 (1913), in part.—Not Buchanan-Hamilton.

Juniperus recurva var. *densa* Hort. Kew, 1880 (in Herb. Arnold Arb.); probably not Carrière.

Juniperus morrisonicola Hayata in Gard. Chron. ser. 3, XLIII. 194 (1908); in Jour. Coll. Sci. Tokyo, XXV. art. 19, 211, fig. 7 (Fl. Mont. Formos.) (1908); XXX. art. 1, 307 (1911); in Jour. Linn. Soc. XXXVIII. 298 (1908).

YUNNAN: Drainage basin of Erhhai (Lake of Talifu), Tsangshan Range, *J. F. Rock*, nos. 3147, 3150, April, 1922; Yangtsze watershed, Prefectural District of Likiang, eastern slopes of Likiang Snow Range, alt. 3000–4600 m., *J. F. Rock*, nos. 3434, 3452, 3453, May–October, 1922; between Lanping and Kau-ho-ten on Yun-lu-shan, alt. 3300 m., *J. F. Rock*, no. 8155, March, 1923; without precise locality, alt. 2900–3200 m., *C. Schneider*, no. 3420, August, 1914.

SZECHUAN: Liuku, alt. 3800–4000 m., *C. Schneider*, no. 1313, May, 1914; Hualì, alt. 4200 m., *C. Schneider*, no. 1411, May, 1914; Ta-ching, Ta-yung-pu, alt. 3500 m., *C. Schneider*, no. 4131, May, 1914.

DISTRIBUTION: Mountains of Formosa westward on the higher mountains of China to the central Himalayas.

This variable species is apparently abundant on the higher mountains of Yunnan as it is elsewhere in central and western China.

Juniperus squamata var. *Fargesii* Rehder & Wilson in Sargent, Pl. Wilson. II. 259 (1914).—Rehder in Jour. Arnold Arb. IV. 126 (1923); in Bailey, Cult. Evergreens, 199 (1923).—Dallimore & Jackson, Handb. Conif. 260 (1923).

YUNNAN: Mount Lauchunshan, southwest of Yangtsze bend at Shiku, alt. 3300 m., *J. F. Rock*, nos. 8377, 8378, in 1923; Yunnanfu, *C. Schneider*, no. 57, February, 1914; without locality, *G. Forrest*, no. 8268.

SZECHUAN: Hui-li-chou, alt. 3500 m., *C. Schneider*, no. 565, March, 1914.

DISTRIBUTION: mountains of central and western China.

Juniperus squamata f. *Wilsonii* Rehder in Jour. Arnold Arb. I. 191 (1920); IV. 126 (1923); in Bailey, Cult. Evergreens, 200 (1923).

YUNNAN: between Lanping and Kao-ho-ten, alt. 3300 m., *J. F. Rock*, no. 8154, March 1923; Yangtsze watershed, Prefectural District of Likang, eastern slopes of Likang Snow Range, *J. F. Rock*, no. 3568, May–October, 1922; same locality, alt. 2900–3200 m., *C. Schneider*, no. 3305, October, 1914; district of Chung-tien, alt. 3700–3900 m., *H. Handel-Mazzetti*, no. 4643, August, 1914; without locality, *G. Forrest*, no. 10496.

SZECHUAN: Ning-yuan-fu, Lo-tieh-shan, alt. 4200 m., *C. Schneider*, no. 910, April, 1914; between Woloho and Hunka, alt. 3300 m., *C. Schneider*, no. 3896, June, 1914.

DISTRIBUTION: high mountains of Formosa and of western China.

Schneider's nos. 3305 and 3896 have fruits larger than is usual in the species.

Juniperus recurva Buchanan-Hamilton apud D. Don, Prodr. Fl. Nepal. 55 (1825).—Loudon, Arb. & Frut. Brit. iv. 2504, fig. (1838).—Endlicher, Syn. Conif. 18 (1847).—Griffith, Notul. iv. 26 (1854); Icon. Pl. Asiat. iv. tt. 373–374 (1854).—Hooker f., Himal. Jour. ii. fig. facing p. 51 (1854); Fl. Brit. India v. 647 (1888), excluding synonym.—Parlatore in De Candolle, Prodr. xvi. pt. ii, 481 (1868).—Brandis, Forest Flora Brit. Ind. 536 (1874); Indian Trees, 694 (1906).—Gamble, Ind. Timbers, 412 (1881).—Masters in Gard. Chron. n. s. xix. 468 fig. 69 (1883).—Kent in Veitch, Man. Conif. 185, figs. 57, 58 (1900).—Clinton-Baker, Ill. Conif. ii. 75, t. facing p. 74, fig. 1 (1909).—Elwes & Henry, Trees Gr. Brit. & Irel. vi. 1419, t. 349 (1912).—Bean, Trees Shrubs Brit. Isles, i. 674, t. (1914).—Rehder in Bailey, Cult. Evergreens, 200 (1923).—Dallimore & Jackson, Handb. Conif. 255 (1923).

Sabina recurva Antoine, Cupress. 67, t. 88, fig. e-m, t. 91 (1857).

Juniperus recurva var. *a. typica* Patschke in Bot. Jahrb. xlviii. 776 (1913).

YUNNAN: between Tengyueh and Likangfu, via Shweshanting, Kantingai Feilungkiao-Yunlung, Lanping, Cheinchuan and Likang, alt. 3300 m., *F. J. Rock*, no. 8156, March, 1923; mountains above Tseku and Tseh-chung, Mekong-Salween watershed, *J. F. Rock*, no. 8821, in 1923; Mekong valley alpine regions round Yetche, *J. F. Rock*, no. 9066, May, 1923; Salween Valley, border of Tsarong, Tibet, alt. 2600–2900 m., *J. F. Rock*, no. 11495, in 1923; Yangtsze-Mekong watershed, alt. 3600–4050 m., *H. Handel-Mazzetti*, no. 8842, June, 1916.

DISTRIBUTION: Himalayas eastward to the high mountains of north-western Yunnan.

The fruit of the Yunnan material is rather smaller than that on specimens from Sikkim with which it otherwise agrees. Yunnan is a new station for the range of this species which heretofore has not been authentically known from China. The material referred by Masters (in Jour. Linn. Soc. xxvi. 542 (1902)) to this species belonging to *J. squamata* Buch.-Ham. According to Rock's field notes this Juniper varies from a low shrub to a small tree 15 ft. tall.

Juniperus Wallichiana Hooker f. apud Parlatores in De Candolle, Prodr. xvi. pt. II. 482 (1868).—Brandis, Forest Fl. Brit. Ind. 537 (1874); Indian Trees, 695 (1906).—Gamble, Manual Ind. Timbers, 412 (1881).—Henry in Elwes & Henry, Trees Gr. Brit. & Irel. vi. 1423 (1912).—Clinton-Baker, Ill. Conif. III. 32, t. (1913).—Rehder in Bailey, Cult. Evergreens, 202 (1923).—Dallimore & Jackson, Handb. Conif. 266, fig. 61 (1923).

Juniperus pseudosabina Parlatores in De Candolle, Prodr. xvi. pt. II, 482 (1868), in part.—Hooker f. Fl. Brit. Ind. v. 646 (1888).—Beissner, Handb. Nadelholzk. 106 (1891), in part.—Not Fischer & Meyer.

Juniperus Wallichiana var. *meionocarpa* Handel-Mazzetti, Pl. Nov. Sin. Fortsetz. 26, p. 1 (Anzeig. Akad. Wiss. Wien. 1924, no. 14) (1924).

YUNNAN: Mount Lauchunshan, southwest of the Yangtsze bend at Shiku, *J. F. Rock*, no. 8387, in 1923; Lotueshan, mountains of Labako, west of the Yangtsze bend at Shiku, *J. F. Rock*, no. 9559, in 1923; Mount Peimashan, Mekong-Yangtsze divide between Atuntze and Pungtzera, *J. F. Rock*, nos. 8837, 11353, in 1923; Mountains of Moting, northeast of the Yangtsze-Mekong watershed, *J. F. Rock*, no. 9336, June, 1923.

DISTRIBUTION: Himalayas from Chamba and Almora eastward through Nepal and Sikkim to the mountains of northwestern Yunnan.

Dr. Handel-Mazzetti was the first to record this species from China though he would refer the specimens to a distinct variety based on the upright or ascending fruit, but I do not see how they differ from material collected in Sikkim and on other parts of the Himalayas. According to Rock this is sometimes a tree from 50 to 75 ft. tall with a trunk as much as 4 ft. in diameter. All the specimens before us are in fruit and there are no juvenile leaves. The branches are markedly tetragonal and the arrangement of the leaves on the ultimate branches is, with rare exceptions, opposite and decussate, very occasionally are they ternate. The gland on the back of the leaf is very marked and the apex of the leaf is incurved. The blue-black, ovoid, one-seeded fruit is about 1 cm. long and obtuse at the summit. I think it best to keep this Himalayan Juniper distinct from the Altai and Turkestan plant named *Juniperus pseudosabina* by Fischer & Meyer. There is material in this herbarium from Kansu which I believe belongs to Fischer & Meyer's species. In this the adult branchlets are less quadrate, the leaves on the ultimate branchlets are ternate and not so thick, and the fruit is oval.

To *J. Wallichiana* Hook. f. probably belongs the material collected by E. E. Maire at 3200 m. altitude on the Ta-hai-tse plateau in May, 1912, and by Lévillé (in Monde des Pl., 1914, 20) referred to *J. tamariscifolia* Ait., a species that is not known to grow in China.

Juniperus chinensis Linnaeus, Mant. 127 (1767).—Rehder & Wilson in Sargent, Pl. Wilson. II. 60 (1914) where full references to literature and synonymy will be found to date.—Hayata in Tokyo Bot. Mag. xxxi. 115 (1917).—Chun, Chin. Econ. Trees, 40 (1922).—Rehder in Jour. Arnold Arb. iv. 127 (1923); in Bailey, Cult. Evergreens, 203 (1923).—Dallimore & Jackson, Handb. Conif. 237, fig. 51 (1923).

YUNNAN: high plateau between Talifu and Likiang to the foot of the Likiang Snow Range, *J. F. Rock*, no. 3278, May, 1922; Yunnanfu, cultivated, *C. Schneider*, no. 51, February, 1914; Pan-long-se, alt. 2990 m., *E. E. Maire*.

DISTRIBUTION: northeastern Asia, Japan, Korea, Manchuria and China. Often cultivated in gardens and planted among tombs and in temple grounds.

NOTES.

The Arnold Arboretum expedition to North Central Asia.¹—From two letters recently received from Mr. Rock, the following extracts are of general interest, describing as they do an almost unknown region and the hardships and difficulties it presents for exploration.

“High plateau of the Kokonor, Oct. 9, 1925
“We have been on the Kokonor plateau for some time and as the Dulanssu (on the map Dulankit) trip proved a very arduous and disappointing one, I decided to give it up and we made our way back to the lake (Kokonor) crossing the sand dunes and thence up a gorge known as the Rako gorge. Looking for trees or even shrubs on the Kokonor is like looking for a needle in a haystack. At Rako, where there are Tibetan and Mongolian encampments (nomads), we found two species of *Picea* and quite a number of shrubs including *Rhododendrons*. I was very much surprised to find *Rhododendrons* so far north. We thence made our way across the Tapanshan, a high range part of the Nanshan, not a tree in sight, but several bushes, including three species of *Rhododendrons* at 12500 ft. elevation. They grow only on the northeastern slopes of the range where the snow does not melt. Not a single bush could be seen on the southwestern slope which receives the afternoon sun and where there is no snow. This range is the divide between the central Asian plateau and the Yellow River and is a formidable barrier. At Komangssu, called by the Tibetans Serku gombo, and not on any map, we found extensive forests of a single species of *Picea*, which reaches a height of over 100 ft. with trunk two feet in diameter. A tree 1½ ft. in diameter had 119 rings. The tree resembles much *Picea Meyeri*; there is a slight pubescence on the slender branchlets, the needles are less robust and the cones much smaller. The bark is the same as found on *Picea Meyeri* in the Tebbu country. We collected quite a quantity of seed, which I shall forward from Kanchow in the north later on with a number of seeds of various *Berberis*, *Cotoneaster*, *Clematis*, *Lonicera*, etc., which formed the underbrush; in this *Picea* forest only this one species occurs and forms extensive forests. Komangssu is one stage from the Tapanshan. We are again in Tibetan grass country camping. It is bitterly cold, the temperature in my tent has been 27° Fahrenheit, and fire is impossible. No charcoal could be bought, not even in Lanchow, where they burn coal. It has been snowing now for a night and a day, and while I write this the snowflakes are whirling down from a dull sky. Camping under such conditions, with no other fuel than Yak dung, and that now soaked with snow, is very trying indeed. Yak dung is difficult to find now as the plain is covered with snow, all the grass is hidden and the animals are having a hard time; we carry beans for the horses and mules, but grass is an essential. We hope it will clear shortly and so we will be able to proceed, otherwise we would have to go south to Peitating, a forlorn walled village, the last place where cultivation is carried on, to remain until the weather clears. We have one high pass yet to cross ere we reach the main Nanshan, which separates us from Kanchow and of which the Richthofen range is a part. I sent you various seeds from the Kokonor region which I sent to Tankar to be mailed. I hope you will have received them

¹ See Vol. vi. 213

before this. There are snow ranges on both sides of us, but they are as bare as a rock, not a vestige of plant life is visible. The scarcest thing in this country is a tree or a bush, everything is barren, and searching for such is indeed an undertaking. The Kokonor region is the bleakest imaginable. Cold winds blow from the Northwest almost continually and my tent, elev. 10700 ft., was nearly blown into the lake one night at 2 a. m. had my men not come speedily to my rescue. It blows a veritable gale up there beginning at 10 p. m. and lasting until after 2 a. m. The nomads camp at the very foot hills in sheltered nooks, but when travelling one cannot go very far off the trail, as it would consume a good deal of time every day. The Kokonor region is indeed poor picking for a botanist but rich in bird life. I never saw so many birds in one region as on the Kokonor, we made a large collection, and I suppose the Doctor will be glad to hear about this. I have been told by Tibetans that there are forests to southwest of Kanchow which corresponds to the Richthofen range which name is of course not known here. We shall reach the range in about 8 or 10 days, providing the weather clears and the sun melts the snow, as it must, as it is much too early for the real winter to set in, this being only the 9th of October. Once while camping on the Kokonor (lake) our camp was visited by Tibetan robbers, sneak thieves, in the night, but they were chased off by our Mohammedan soldiers, without whom it would be impossible to travel in this part of the world. General Machi detailed for me an old hardy Moslem soldier, who knows this region exceedingly well, and who is always out on the plains. He and ten soldiers, Moslems, escorted the Panchen Lama from Taichinere in the northern Tsaidam, to Suchow and Kanchow. He is a remarkable man, absolutely fearless and the Tibetans know him. The chiefs of the various nomad clans pay him great deference. He is to go with me to the Amne Machin next year; he has been there four times and speaks the Ugolok language as well as Tibetan. When travellers or geographers speak of the forests of the Kokonor, they can mean no other than the forests on the upper Yellow River, viz. the Amne Machin and below, for there are no forests north of the Amne Machin. General Peirera, whose journal I have, speaks of not seeing either a shrub or a tree until he reached Jekundo, 18 stages from Tankar, and Jekundo is in Eastern Tibet and not in the Kokonor. It is true huge logs are rafted down the Yellow River to Kanchow, but they all come from the upper Yellow river, that is the forests of the Amne Machin. I found out that at Dulanssu was only a grove of trees, one species of spruce and one of oak, facing a monastery. People used to bare hills are apt to call a grove of trees a "ta lin ku" or large forest of big trees. Of all the regions of Kansu that I have seen so far, there is none that can compare with the Tebbu country, which is a perfect paradise for a botanist or a dendrologist. The mountains of Sining and the huge divide between the Sining and the Yellow River are absolutely bare of trees, not even shrubs are visible, and Farrar could only have been out for flowering plants such as *Primulas*, *Meconopsis*, etc., which are apparently plentiful in the early summer."

Kanchow, Oct. 25, 1925

"After much hunting for trees we reached Kanchow on the Mongolian border, to replenish our provision boxes, to buy beans for the horses, etc. From our camp in the snow, whence the previous epistle was written, we proceeded to Obo and thence went west between the North Kokonor barrier range and the Richthofen range. Obo is a dot in a sea of grass where live a few Mohammedans who buy wool from the Tibetans. Nothing could be bought there as they bring their own supplies up either from Sining or down from Kanchow. A stream flows between these two mighty snow ranges, both called the Nanshan by the Chinese, the northern one facing the North Kokonor barrier range being our Richthofen range. The mountains for four days journey were absolutely bare. The grass country between the ranges being dotted here and there by Nomads. We came on to a Tibetan nomad wedding and it seemed so absurd in this wild country to see the women dressed in the finest and overlaid with silver jewelry, the furs they wore were exquisite. I finally spied in a deep rocky gorge a dying forest of spruce and we went directly thither and pitched our camp. It was indeed a dying forest.

The nomads had been cutting and cutting; we secured only a few seeds here. We were told by the nomads that on a mountain further west called Ngiusinshan, and on which a Mongol tent lamassery, Arketassu, is situated, are to be found extensive forests. We made our way to Arketassu and pitched our tents on the edge of the mighty spruce forests. The most extensive forest was on this huge mountain 18000 ft. in height, but strange to say it consisted of a single species of *Picea*. We camped there several days and searched the mountain up and down, but everywhere we were greeted by the same species. Above the spruce forest, which extends to 11500 ft. (stunted trees) there is only willow scrub 3 ft. tall, stiff *Caragana* and *Potentilla fruticosa* bushes, no *Abies*. On the North Kokonor barrier range facing the Richthofen range there grows a *Juniper* of a fairly large size; it takes the place of *Abies* above the *Picea* forest. We went on and on following the Babo ho where it is joined by a stream coming from the mountains north of the Karanor, called the Heho. There we found forests but the same species of *Picea*. We collected specimens naturally for comparison but every tree is alike. We followed the Babo ho as far as we could. It becomes a big river, cuts through the Richthofen range and out to the plain west of Kanchau. The stream zigzagged and was unfordable. It entered a gorge about 7000 ft. deep and disappeared between snow-capped mountains. It was impossible to proceed further, no trail, no nomads, nothing but rocky cliffs with *Juniper* trees. The hills were now bare and composed of Red Sandstone. We returned. The North Kokonor barrier range and the Richthofen join here in one mighty mass of bare ranges through which the river has cut its way. We impressed a nomad Tibetan to guide us across the mountain, which separates us from the plains of Mongolia. For four days we wandered over the mountains, down gorges, and up passes, sleeping as high as at 12500 elevation, with a temperature of 6° Fahr. in the tent and not a stick of wood, as we could only take enough along, when we did find any, to cook two meals a day. On the northern slopes, in a rocky gorge which we descended on to the plain, the Hung shui k'ou, we found *Picea* forests, but only small trees, perhaps the locality had something to do with the size. They grew on rocky dry slopes, but appeared to be the same species as found on the North Kokonor barrier range and on Ngiusinshan. These *Picea* forests have no under-shrubs whatever, moss-covered ground and are pure stands of a single species. I have many photographs to illustrate this region. We shall continue west; there are large tracts of forest and I shall satisfy myself in regard to the trees of which they are composed and shall of course collect the seeds. It will not be possible to go the whole northern length or rather to the extreme west of the Richthofen range on the northern slopes this year, as it is getting too cold and camping at such altitudes in such a latitude, exposed to the cold winds of the Mongolian desert, is more than I can at present endure. Had political circumstances permitted my coming here earlier all could have easily been done, but fates were against us. This region is terribly expensive, grass or hay is sold by the pound. It is also difficult to hire animals to go to these out of the way places, as the muleteers are used to travel only on the big roads from inn to inn. It is hard on the animals to spend night after night out in the open, in snow and ice, with a temperature as low as 2 and 4° Fahrenheit, and with inadequate fodder, as often one is forced to camp where there is no grass. Camels cannot go where there is ice and steep hillsides, as they slip easily and break their legs, so it is quite a problem, and the only way I could get mulemen to go was to commandeer them through the officials, and then state we are going there and there, and finish by saying no word can be said and they must go. They whine continuously then and groan, so it gets on one's nerves, and to make things unpleasant they go so slow, one is glad to get rid of them when possible. They are all alike."

Rubus Chingii Hu.—On page 141 of vol. VI. of this Journal the name **Rubus Chungii** should be changed to **Rubus Chingii**. The species was named in honor of Mr. Ren-Chang Ching who first collected it.





THUJA ORIENTALIS L.

Tree in Central Park, Peking